Program Assessment Report
B.S. in Crop Science
University of Arkansas
Academic Year 2024-2025

1. Department Name & Contact Information

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2. Department Mission

The mission of the Department of Crop, Soil, and Environmental Sciences is to provide superior education programs at the undergraduate and graduate levels, conduct innovative research and extension programs in the crop, soil, and environmental sciences and provide superior service for citizens of Arkansas and the nation.

3. Program Goals

1. Graduates have the discipline-specific knowledge in crop sciences required to perform successfully in private, government, or academic entry-level positions.
2. Graduates are able to critically analyze, synthesize, and evaluate new information to make informed decisions.
3. Graduates have the ability to solve complex, multidisciplinary problems.
4. Graduates are able to prepare and synthesize information to effectively communicate, both orally and in writing.

4. Student Learning Outcome 1. Students will demonstrate the discipline specific knowledge required to function as crop science professionals.

A. Assessment Measure for Outcome 1

- Achievement is measured using **pre- and post-assessment**.
- This is a ***direct*** measure of student learning.
- Pre- and post-assessment includes 25 test questions from the CPSC faculty covering crop science/physiology, weed science/pest management, crop production, and soil fertility/plant nutrition. These areas represent essential concepts for discipline-specific knowledge of students completing a crop science degree.
- The initial pre- and post-assessment was generated by the CPSC faculty during the spring 2016. Target populations are at least half of the (incoming) and half of the fall graduating CPSC class.
- Scores are calculated for each assessment with the range, average, and median calculated for the cohort of pre- or post-assessments. We target calculation of the change in scores from pre- to post-assessment.

B. Acceptable and **Ideal Targets** (not required for indirect measures)

- Acceptable: We are targeting a 50% increase in the mean and/or median test scores between the two populations (incoming and graduating students).

- Ideal: We are targeting a 75% increase in the mean and/or median test scores between the two populations (incoming and graduating students).

C. Summary of Findings

- Median post-test scores improved from 34% to 78% representing a 56% increase from the pre-test to post-test scores. The score improvement exceeded the acceptable increase of 50% gain in scores between the pre-test and post-test.

D. Recommendations

- The CSES Department has hired several new faculty and the CPSC curriculum is undergoing revision. It seems that a review of the questions on the pre-test/post-test would be helpful at this point to ensure that the assessment technique for student learning outcome 1 remains on target.
- The target course for pre-testing has been moved to CSES 12003 Intro to Plant Sciences to capture incoming CPSC freshman.
- The target course for post-testing should continue to be CSES 40103. CSES 40103 was moved to spring semester a few years ago to help with scheduling and should capture students who are close to graduating in their final semester.

5. Student Learning Outcome 2. Students will demonstrate the ability to critically evaluate situations or scenarios to arrive at well thought out and supported decisions and outcomes.

A. Assessment Measure for Outcome 2

- Achievement will be measured using a critical thinking scenario and assessed using a **critical thinking rubric**.
- This is a ***direct*** measure of student learning.
- Assessment scenarios will be generated to cover application of critical thinking in crop science contexts.

B. **Acceptable** and **Ideal Targets** (<u>not required</u> for indirect measures)

- Acceptable: 50% of seniors assessed will score proficient or greater.
- Ideal: 75% of seniors assessed will score proficient or greater.

C. Summary of Findings

- 75% of CPSC seniors were proficient in defining the problem.
- 87.5% of CPSC seniors were proficient in identifying strategies to solve the problem.
- 75% of CPSC seniors were proficient in proposing solutions to solve the problem.
- 75% of CPSC seniors were proficient in evaluating the solutions to solve the problem.
- 62.5% of CPSC seniors were proficient in implementing solutions to solve the problem.
- 75% of CPSC seniors were proficient in evaluating the outcomes.

D. Recommendations

- Critical thinking was evaluated in 2023-2024 and the scores were similar to what is reported here for 2024-2025. Courses in the CPSC curriculum are undergoing revision. With course and curriculum revision, CSES faculty should consider how best to assess critical thinking as a student learning outcome in the CPSC curriculum. An option may include a critical thinking exercise on

the post-assessment targeting learner outcome #1 that would be scored independently using the critical thinking rubric.

6. **Student Learning Outcome 3.** Students will demonstrate the ability to work through and solve complex, multidisciplinary problems.

   A. **Assessment Measure for Outcome 3**

- Achievement will be measured using a problem-based scenario and scored using a **problem solving rubric**.
- This is a ***direct*** measure of student learning.
- CSES 42204 Soil Fertility, a required course for all CPSC students, is the target course for the problem solving assessment.
- Assessment scenarios cover application of problem solving in crop science contexts.

- **Acceptable** and **Ideal Targets** (<u>not required</u> for indirect measures)
- Acceptable: 50% of seniors assessed will score proficient or greater.
- Ideal: 75% of seniors assessed will score proficient or greater.

   B. **Summary of Findings**

- During 2024-2025, eight CPSC students were evaluated during a multi-step computational and decision-making problem-solving exercise from CSES 42204 Soil Fertility. Students were assigned a complex problem where they first manipulated real-world data and then had to assess the results, explaining their rationale and justification for their interpretations. Each student was asked to justify how and why they did what they did and interpret their results in a >1-page summary. The summary is a large component of the focus for applying the assessment rubric.
- Scores for all components rated a median level of proficient. More than 75% of the students were proficient in evaluating solutions and implementing solutions.

   C. **Recommendations**

- The target was reached of at least 50% of students achieving a proficient level in problem solving. Problem solving requires comprehension, application, analysis, synthesis, and evaluation, i.e. learning at high cognitive levels. In general, faculty should continue to consider and articulate where and when students have opportunities to develop (learn and repeatedly practice) cognitive skills in problem solving across the curriculum.

7. **Student Learning Outcome 4a.** Students will demonstrate the skills required to effectively communicate technical/scientific information in oral platforms.

   A. Assessment Measure for Outcome 4a

- Achievement was assessed using an **oral communication rubric** during oral presentations where the student 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.
- CSES 3023 CSES Colloquium (FA), an upper division, professional development, communication-intensive course that should capture at least half of the senior population, is the target course for the assessment.

- CSES 462V Internship, Special Problems, and Honors thesis defenses provide opportunities where students present their experiences to an audience and the oral communication rubric can be used to evaluate communication skills.
- This is a ***direct*** measure of student learning.

B. Acceptable and **Ideal Targets** (<u>not required</u> for indirect measures).

- Acceptable: 60% of seniors assessed will score proficient or greater.
- Ideal: 80% of seniors assessed will score proficient or greater.

C. Summary of Findings

- CSES 30203 CSES Colloquium was not offered in the Fall of 2024 due to Dr. Mary Savin moving to the HORT department. Also, there were no students enrolled in 462V Internship.

D. Recommendations

8. Student Learning Outcome 4b. Students will demonstrate the ability to integrate, organize, and effectively present written reports of technical/scientific information.

A. Assessment Measure for Outcome 4b

- Achievement was assessed using a **written communication rubric** for laboratory reports and technical/scientific proposals where the student has analyzed, synthesized and evaluated information from independent sources as part of a class project and/or completed an independent research project as part of a special problems, research project or internship class.
- CSES 462V Internship, Special Problems, and Honors thesis research provide opportunities where students have completed independent research projects. Students enrolled in ENSC 3263 have to write papers in which they organize data and information they have analyzed, synthesized, and evaluated to clearly and fluently convey a message.
- This is a ***direct*** measure of student learning.

B. **Acceptable** and **Ideal Targets** (<u>not required</u> for indirect measures).

- Acceptable: 60% of seniors assessed will score proficient or greater.
- Ideal: 80% of seniors assessed will score proficient or greater.

C. Summary of Findings

For written communication, four CPSC students were assessed for skill level in written communication using a 1-page report on the problem solving exercise in the lab associated with CSES 42204. The acceptable target is for 50 % of the students to be rated as proficient. Average scores of below proficiency and between basic and proficient skill levels at values of 2.1 to 2.4 were assigned to CPSC students across the different criteria within written communication. Results indicate that there is room for improvement in students' writing skill development. Writing skills indicate that the CPSC student population would benefit from more writing throughout the curriculum. Writing is an important area to target curriculum revisions for development of writing skills.

D. Recommendations

- Crop Science faculty should reevaluate how to incorporate more opportunities for writing into the curriculum for students to develop writing skills to better meet the student learner outcomes for written communication.

8. Results of Analysis of Assessment of Student Learning Outcome, including General Education student learning outcome 6.1

The CPSC degree-seeking students were evaluated for knowledge, problem solving, and oral and written communication skills. Four years of problem solving assessment evaluated in CSES 42204 Soil Fertility, which is a required course in the CPSC degree program, indicates that problem solving development seems to be sufficient in the curriculum. Assessment of writing was incorporated with use of the assessment rubric applied to a formal writing assignment that was administered in CSES 42204. Assessment of significant writing assignments highlights the need for evaluation of how to strengthen student learning of writing skills throughout the curriculum. Use of supporting material to support thesis statements is another area revealed through oral communication assessment that needs further consideration for development throughout the curriculum.

CSES 42204 is the course that meets General Education student learner outcome 6.1., to "gain the ability to synthesize, integrate, and apply knowledge developed throughout the undergraduate years". As a required portion of CSES 42204, students generate data, a written report and provide an oral presentation related to projects, the applications to their career, and reflections of their self-learning and development. Students build their portfolio knowing that it is documentation to demonstrate achievement of student learner outcomes.

Upon course completion and reaching goals embodied in outcome 6.1, students write a 1-page essay reflecting upon how their identification, evaluation and mastering the problem has prepared them to develop and use written, oral, and/or multimodal communication abilities; quantitative literacy; and critical thinking and/or ethical reasoning skills and abilities. Eight CPSC students in CSES 42204 during the fall 2024 semester completed the assignments, with 75% of the students demonstrating proficiency or mastery in student learner outcome 6.1.

9. Any Changes to Degree/Certificate Planned or Made on the Basis of the Assessment and Analysis

The CPSC curriculum is undergoing revision to make the degree plan more streamlined. The CPSC degree supports a relatively large transfer student population, rather than attracting incoming high school graduates into the major as traditional freshmen. While there are considerations that should be accounted for in evaluating assessment data, including a small dataset of students who are evaluated each year, assessment information regarding writing development and learning to use reputable, reliable and relevant information to support thesis statements may assist in guiding considerations during CPSC curriculum revision.

10. Any Changes to the Assessment Process Made or Planned

Inclusion of opportunities to assess critical thinking should be considered while CSES faculty are revising courses with new faculty and making revisions in the CPSC curriculum.

11. Supporting Attachments

- Problem solving rubric adapted from Association of American Colleges and Universities
- Oral communication skills rubric adapted from Association of American Colleges and Universities
- Written communication skills rubric adapted from Association of American Colleges and Universities