

# Academic Assessment Report

## BEST PRACTICES IN STUDENT LEARNING OUTCOMES

### (B.S. DEGREE / CROP SCIENCE)

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#### Contact

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#### CSES 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.

#### Program Goals

*(Program goals are broad general statements of what the program intends to accomplish and describes what a student will be able to do after completing the program. The program goals are linked to the mission of the university and college.)*

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.

#### Student Learning Outcomes

*(Student Learning Outcomes are defined in terms of the knowledge, skills, and abilities that students will know and be able to do as a result of completing a program. These student learning outcomes are directly linked to the accomplishment of the program goals.)*

1. Students will demonstrate the discipline specific knowledge required to function as crop science professionals.
2. Students will demonstrate the ability to critically evaluate situations or scenarios to arrive at well thought out and supported decisions and outcomes.
3. Students will demonstrate the ability to work through and solve complex, multidisciplinary problems.
4. Communication skills
  - a. Students will demonstrate the skills required to effectively communicate technical/scientific information in oral platforms.
  - b. Students will demonstrate the ability to integrate, organize, and effectively present written reports of technical/scientific information.

#### Assessment Measure for Outcome 1

- Achievement will be measured using **pre- and post-assessments**.
- This is a **direct** measure of student learning.

- Learning will be measured by generating an assessment of 25 test questions from the CPSC faculty to cover 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- post-assessment was generated by CPSC faculty during the spring 2016. Target populations are at least half of the (incoming) and half of the fall graduating CPSC class.
- The post-assessment was administered in the fall of 2016 in the CSES 4013 course.
- Scores were 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.

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

- The use of pre- and post-assessments are a new initiative for CSES; therefore, we are unsure of how “incoming” students in particular will perform on the pre-assessment.
- Acceptable: We are initially targeting a 50% increase in the mean and/or median test scores between the two populations (incoming and graduating students).
- Ideal: We are initially targeting an 80% increase in the mean and/or median test scores between the two populations (incoming and graduating students).

#### **Key Personnel** (who is responsible for the assessment of this measure).

- In 2015-2016, we expected CSES 2103 Crop Science (SP), a required course for all CPSC student, to be the target course for the pre-assessment. We have revised this to utilize the CSES recruiter to target incoming CPSC students.
- CSES 4013 Advanced Crop Science (FA), required course for all CPSC students, is the target course for the post-assessment.

#### **Summary of Findings**

- Post-assessment results obtained from 11 students in the fall 2016 revealed scores from 54 to 86 % with an average of 67 % and a median of 66 %.
- Pre-assessment was not conducted so we are not able to evaluate the improvement from pre- to post-assessment in students completing the CPSC degree.

#### **Recommendations**

- The CPSC faculty continued discussion about the appropriate venue to administer the pre-assessment for incoming students. The concern is to capture knowledge of students entering the department in their first year rather than targeting CSES 2013 in the spring of the sophomore (second) year. It was decided to have the departmental recruiter contact students individually to have them come in and take the pre-assessment in their first semester in the department.
- CSES 4013 is an appropriate course to administer the post-assessment as it is required and it should be taken by students as they near completion of their CPSC degree. The course is also being moved to the spring semester to accommodate advising concerns, which should make it closer to most students’ graduation, if they are following a traditional schedule and graduating in May.

#### **Assessment Measure for Outcome 2**

- Achievement will be measured using a critical thinking scenario (administered during class, potentially included on the post-assessment for learner outcome #1) 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.

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

- Acceptable: 50% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

**Key Personnel** (who is responsible for the assessment of this measure)

- CSES 4013 Advanced Crop Science (FA), required course for all CPSC students, is the target course for the assessment.

**Summary of Findings**

- The target class to implement assessment of critical thinking is CSES 4013 Advanced Crop Science which is a fall course. Faculty continue to contemplate how to best evaluate critical thinking using the assessment rubric within the context of the course.

**Recommendations**

- Recommendations will be forthcoming with the generation of data in the upcoming academic year.

**Assessment Measure for Outcome 3**

- Achievement will be measured using a problem based scenario (administered during class, potentially included on the post-assessment for learner outcome #1) and scored using a **problem solving rubric**.
- This is a **direct** measure of student learning.
- Assessment scenarios will be generated to cover application of problem solving in crop science contexts.

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

- Acceptable: 50% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

**Key Personnel** (who is responsible for the assessment of this measure)

- CSES 4013 Advanced Crop Science (FA), required course for all CPSC students, is the target course for the problem solving assessment.

**Summary of Findings**

- The target class to implement assessment of critical thinking is CSES 4013 Advanced Crop Science which is a fall course. Faculty continue to contemplate how to best evaluate critical thinking using the assessment rubric within the context of the course.

**Recommendations**

- Initial experience with the problem solving question in the ESWS program assessment has shown the importance of considering the rubric while generating the problem solving question for assessment, and not just utilizing the rubric during the assessment stage of program review.

**Assessment Measure for Outcome 4a**

- 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.
- This is a **direct** measure of student learning.

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

- Acceptable: 70% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

**Key Personnel** (who is responsible for the assessment of this measure).

- 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.

**Summary of Findings**

- CSES Colloquium is a fall course which is required for CPSC students. Most enroll as seniors, although some students are juniors when they take the course. Two of the students enrolled in the course during the fall 2016 were CPSC students; however, only one was a senior, while one was a junior.
- Performance was evaluated during a 10-12 minute presentation that was given as a member of a research team. Teams selected overarching topics and individuals' subtopics to support a single overarching thesis. Students were taught how to work in a team, research and cite evidence, and develop and deliver a presentation to a scientific audience of peers. Scores were assessed for organization, language, delivery, supporting material, and central message. The breakdown is as follows:  
 Organization: proficient for the minimum, maximum, average, and median;  
 Language: proficient for the minimum, maximum, average, and median;  
 Delivery: basic for the minimum, maximum, average, and median;  
 Supporting material: beginning to proficient with an average and median of basic;  
 Central message: beginning to proficient with an average and median of basic

**Recommendations**

- These data are from two students, one of whom was a junior. We will continue to collect data during the next few years to assess performance in oral communication. Supporting and delivering a concise, well supported scientific presentation can be difficult, especially when working with others. However, the development of these skills are critical to functioning in the workforce in the applied sciences.

**Assessment Measure for Outcome 4b**

- Achievement will be 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.
- This is a **direct** measure of student learning.

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

- Acceptable: 70% of seniors assessed will score proficient or greater.
- Ideal: 90% of seniors assessed will score proficient or greater.

**Key Personnel** (who is responsible for the assessment of this measure).

- CSES 462V Internship, Special Problems, and Honors thesis research provide opportunities where students have completed independent research projects. Students have to write papers in which they organize data and information they have analyzed, synthesized and evaluated to clearly and fluently convey a message.

### **Summary of Findings**

- While an internship or special problem experience is required in the CPSC degree, writing skills were not evaluated during the 2016-2017 year.

### **Recommendations**

- CPSC need to reevaluate an approach that allows for systematic evaluation of written communication skills among graduating CPSC students.

### **Overall Recommendations**

- Currently, there are no changes recommended for the CPSC Assessment Plan, rather a full implementation is needed. As the CSES Department implements and revises the new procedures being developed for assessment, they need to become ingrained in the fabric of the curriculum and a routine part of the academic culture of faculty. The CSES Department needs to continue to refine the processes for seamless implementation such that assessment is an integrated component of all faculty's teaching.

### **Action Plan**

- The pre-assessment needs to be given to incoming students, while the post-assessment will be administered during CSES 4013.
- Assessment implementation and progress will be a topic at faculty meetings.
- More data need to be generated during the 2017-2018 academic year before CSES can determine if action is needed to alter assessment, student learner outcomes, and/or curriculum.

### **Supporting Attachments**

- Pre-/post-assessment for CPSC
- Problem solving rubric adapted from Association of American Colleges and Universities
- Critical thinking 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