**Major Assessment Report 2017-2018**

**Department of Plant Science, Masters of Plant Science Program Review**

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| **De Department and Degree: Plant Science M.S.**    **A Assessment Coordinator: Jacob Wenger**       1. **What learning outcome(s) did you assess this year?** List all program outcomes you assessed (if you assessed an outcome not listed on your department SOAP please indicate explain). Do not describe the measures or benchmarks in this section Also please only describe major assessment activities in this report. No GE assessment was required for the 2016-2017 academic year.   SLO: 4.2 evaluate primary literature and demonstrate competency in interpreting existing data from scientific papers.  SLO: |
| 1. **What assignment or survey did you use to assess the outcomes and what method (criteria or rubric) did you use to evaluate the assignment?** If the assignment (activity, survey, etc.) does not correspond to the activities indicated in the timeline on the SOAP, please indicate why. Please clearly indicate how the assignment/survey is able to measure a specific outcome. If after evaluating the assessment you concluded that the measure was not clearly aligned or did not adequately measure the outcome please discuss this in your report.  Please include the benchmark or standard for student performance in your assessment report (if it is stated in your SOAP then this information can just be copied into the report). An example of an expectation or standard would be “On outcome 2.3 we expected at least 80% of students to achieve a score of 3 or above on the rubric.”   **Assessment used:** Literature Review for Proposed Thesis Project (Assessment A.4 in the Plant Science M.S. SOAP)  **Fit of assessment to SLO:** Masters students are required to complete and defend a thesis proposal prior to advancement to candidacy. This proposal outlines the student’s proposed thesis research including a thorough literature review, a statement of objectives, a hypothesis statement, and experimental methodology. This proposal includes a primary literature review in which students must demonstrate their ability to interpret the literature surrounding their research question in order to build sufficiently rigorous objectives, hypotheses and methodologies. The thesis proposal is arguably the best assessment of SLO 4.2 given that it requires evidence of both 1) the student’s fundamental understanding of the literature, and 2) the student’s ability to interpret the data when formulating an experiment/hypothesis. Further, proposals are retained by the department indefinitely and have a near standardized format making assessment straightforward.  **Method of Evaluation:** A modified version of the Department of Plant Science’s Graduate Student Thesis Proposal Evaluation rubric was employed. This rubric is designed to assess the entirety of the thesis proposal using 4 criteria. We only considered the rubric’s 1st Criterion “Mastery of theories and concepts in the field demonstrated in problem statement and literature review” given that this review is only for SLO 4.2. Criterion 1 was expanded into a new rubric where each of the 7 components of the 1st criterion were assessed independently. Students could receive a score of 1 (does not meet expectations), 2 (meets expectations), or 3 (exceeds expectations). Both the original and modified rubrics can be found included in this report packet. A total of 19 thesis proposals were randomly selected from the department’s records, and distributed amongst 3 faculty for assessment. Proposals were selected from students that had enrolled in the Plant Science Masters within the past 10 years, and included both current and graduated students. Final scores were combined and analyzed by Jacob Wenger.  **Appropriateness of Evaluation:** The original graduate thesis proposal evaluation rubric is used to evaluate early proposal drafts for all plant science masters students in the course of completing AGRI 220. The rubric is comprehensive, accounting for 18 different aspects of the proposal including mastery of subject matter, scientific thought, quality writing, and originality. Finally, the rubric does not assign arbitrary number scores, but rather assesses whether student writing meets the standard of the department or not.  For the modified rubric the first criterion of evaluation “Mastery of theories and concepts in the field demonstrated in problem statement and literature review” was broken down into its 7 components, so that each facet of literature review quality could be assessed independently. This provided a fine grain of resolution for this assessment.  **Standard of student performance:** For each student, the average score across the 7 parts of the rubric should be greater than or equal to 2, meaning they meet the expectations of the department. |
| 1. **What did you discover from the data?** Discuss the student performance in relation to your standards or expectations. Be sure to clearly indicate how many students did (or did not) meet the standard for each outcome measured. Where possible, indicate the relative strengths and weaknesses in student performance on the outcome(s).   On a student-by-student basis, performance met departmental expectations in all instances. All assessed thesis proposals scored a two or higher (mean: 2.35, sd: 0.28), demonstrating that student literature reviews consistently meet departmental standards. Additionally, average student performance was at or above department expectations (>2) in 6 of the 7 subsections of the rubric. Most notably plant science masters scored well in defining objectives, mastery of subject matter, and documenting resources. All scores can be found in the attached documentation. The one area where students did not meet departmental standards was in their statement of hypothesis. Across all 20 proposals assessed the average score for hypothesis statement was a 1.42 (s.d. 0.38), which is considered ‘inadequate’. While this score is low, it is not unusual in applied fields of research such as plant science. Many plant science Master’s theses are an attempt to solve applied problems of agricultural production. Consequently these projects range in design drastically; and may involve traditional hypothesis driven research, new technology trials, breeding projects, or engineering field protocols. Under these conditions many theses are not hypothesis driven, and may not have a clear hypothesis statement (or hypothesis statements may be inappropriate). |
| 1. **What changes did you make as a result of the data?** Describe how the information from the assessment activity was reviewed and what action was taken based on the analysis of the assessment data.   Action has yet to be taken based on the assessment data analysis. The review of thesis proposals found Plant Science Graduate program students to be proficient at reviewing and integrating information from scientific literature. Further, students were scientifically literate and capable of utilizing this knowledge to design scientific experiments, establish research objectives, and demonstrate critical thinking.  However, students did not clearly state hypotheses, or demonstrate hypothesis driven experimental design. In part this is due to the applied nature of plant science research, where many experimental designs do not fit inside traditional hypothesis driven frameworks. That being said, students should be familiar with hypothesis statements and design. Future action will include additional instruction in AGRI 220 on hypothesis design and implementing hypotheses in non-conventional experimental designs. |
| 1. **What assessment activities will you be conducting in the 2017-2018 AY?** List the outcomes and measures or assessment activities you will use to evaluate them. These activities should be the same as those indicated on your current SOAP timeline; if they are not please explain.   The committee will assess outcome 2.1 **“**students will plan and design experiments to test a specific hypothesis.” We will again use the department’s past thesis proposals as a direct assessment of this outcome, and will quantify our findings using another modified version of the Graduate Student Thesis Proposal Evaluation rubric. |
| 1. **What progress have you made on items from your last program review action plan?** Please provide a brief description of progress made on each item listed in the action plan. If no progress has been made on an action item, simply state “no progress.”   **Item 1**. Require a research proposal class and acceptance of proposal by committee. Before starting a research project a student should write a proposal that is formally presented to, and accepted by, their major professor and those of the committee. This requirement can take form in a 3-unit Thesis Proposal course and could be required before advancement to candidacy or some other formal designation indicating this process has occurred as fulfillment toward graduating. **Progress** – All enrolled Master’s students must now complete a draft of their thesis proposal as part of AGRI 220, Research Methods and Communication. This course is taken within the student’s first semester of enrollment and emphasizes scientific writing and literacy. Also, incoming students are presented with a graduation timeline at their program orientation, and in their graduate handbook. This timeline provides a clear expectation of timeliness to both students and their faculty advisors.  **Item 2**. Require graduate coursework outside departmental classes. Many areas in agriculture require specialized knowledge in field outside those traditionally taught in agriculture, especially applied agriculture programs. The panel suggests requiring a student to take at least one 3-unit course outside their college. **Progress** – No Progress - The Plant Science department does not feel it is in the best interest of students to mandate coursework outside of the department. There is little need for further instruction in basic science, as admission prerequisites require all incoming students be well prepared for the specialized degree. There is also concern that mandatory external coursework would disrupt the program’s graduate cohorts, which have proven effective at elevating program quality. Further, the department already allows students to take elective credits outside of the department, in consultation with their faculty advisor. This practice will be continued.  **Item 3**. Develop and adhere to, a clearly articulated roadmap for acceptance to graduation. The roadmap would provide guidelines for faculty and students alike and bring conformity and standardization within the department. The guidelines (e.g., in the form of a handbook) would establish, at a minimum, application and admittance processes, assign faculty sponsor/advisor, identify projects, require proposal acceptance, establish coursework and establish formal process for the thesis defense. **Progress** – Admission standards and timelines are clearly articulated on the departmental website as well as CSU Mentor, thus no adjustments are required. After acceptance, graduation timelines are provided to program students at orientation meetings that are held at the beginning of each semester. This timeline (see Item 1) is also provided in the graduate handbook.  **Item 4**. Establish and codify farm and greenhouse resource priorities. The highest level of prioritization for farm and greenhouse utilization and support should be focused on fulfilling the University mission, specifically instruction and research. Other uses, such as those to generate revenue for the foundation or by leasing to off-campus outside groups should only occur after the internal instructional and research needs have been demonstrably met, even if the financial incentives to support the outside interests are great. **Progress** – Great strides have been made in equipping and utilizing the Jordan Agricultural Research Center. In the past year the facility has the central site of at least a half dozen graduate projects, with many additional students using the space tangentially.  **Additional Guidelines:** If you have not fully described the assignment then please attach a copy of the questions or assignment guidelines. If you are using a rubric and did not fully describe this rubric (or the criteria being used) than please attach a copy of the rubric. If you administered a survey please consider attaching a copy of the survey so that the Learning Assessment Team (LAT) can review the questions. |