**Major Assessment Report 2017-2018**

**Department of Plant Science, Bachelor of Science (B.S.)**

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| **Department and Degree: Plant Science, B.S. degree**  **Assessment Coordinators: Dave Goorahoo\*, Florence Cassel Sharma & Margaret Ellis**  **\*Corresponding coordinator**   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:Outcome 2.3- Students will communicate effectively in written and oral formats**.** |
| 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.”   The CRSC 115(Organic Crop Production) Research Paper was selected to assess SLO 2.3.  On outcome 2.3 we expected that all students score at least 80% in the written AND oral sections, thereby achieving an overall “B (80%)” grade in the assignment.  The complete guidelines and rubric used for the assignment are shown in **Attachments 1 & 2)**. In summary, the primary purpose of the assignment was to develop the student’s ability to provide the latest information on agronomic and cultural management, harvesting, processing and marketing of organic farming produce. Upon successful completion of the assignment, the students would have:  • Recognized that there are multiple electronic and hard copy resources for obtaining information related to Organic farming in the United States(U.S.) ;  • Increased their knowledge about the current economic, political, agronomic, environmental and cultural issues influencing organic farming; and,  • Developed their research skills by conducting electronic searches of the scientific literature, U.S. Government archives and other selected resources related to a specific organic farming topic of interest identified during the semester.  Students were required to compile a “Research paper” using the template provided, and a PowerPoint (PPT) presentation on an assigned topic, in which they reviewed the underlying scientific concepts for the various management practices observed. The course instructor, another faculty member, and classmates evaluated the PPT presentations in accordance with a rubric to assess the student’s ability to synthesize the material presented. The written portion of the assignment were reviewed by the three members of the Plant Science Undergraduate Assessment Coordinators in an effort to assess the student’s ability to recognize the overall interaction between organic crop production and environmental impact. |
| 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).   The summary of **ALL** scores obtained for the twenty-four students enrolled in the course is provided in **Attachment 3.** The mean (± Std. Dev.) grade for the assignment was 82% (± 8%) with total scores ranging from 61% to 97%. Eighteen of the 24 students scored at least 80% in the assignment, which meant that 75% of the students in the course met our expected outcome of attaining a “B” grade. According to the University grading system, a “B” grade is indicative that the student is “Very Good” and “*has demonstrated a high level of competence, showing sustained superiority in meeting all stated course objectives and responsibilities and exhibiting a high degree of intellectual initiative*” (Fresno State Academic Regulations, <http://fresnostate.edu/catalog/academic-regulations/index.html#grading-policies>). In addition, three students (12.5%) scored more than 90% in the assignment, thereby indicating that they “*demonstrated the highest level of competence, showing sustained superiority in meeting all stated”* assignment objectives and guidelines. Just one student scored less than 70%, with eight students (33% of the class) scoring between 70 and 80% in the assignment, which is accepted as a “C” grade implying that the student has “*demonstrated a satisfactory level of competence, showing an adequate level of understanding of course”.*  CRSC 115 is an upper division elective for students expected to be employed in the agricultural sector. Hence, the UG assessment coordinators strongly believe that it is critical that students perform above the “satisfactory C grade” in this research paper. As started earlier, the primary goal of SLO 2.3 is that the student be able to communicate effectively in written and oral formats. Therefore, in addition to the overall score in the assignment, we also assessed the students’ performance in the PowerPoints and written sections.  The summary of scores for the **PowerPoint presentations** obtained for the twenty-four students enrolled in the course is provided in **Attachment 4.** The mean (± Std. Dev.) grade for the presentations was 89% (± 4%) with scores ranging from 80% to 97%. All students scored at least 80% in the assignment, with 71% of the students scoring more than 90%, which meant everyone in the course met or exceeded our expected outcome of attaining a “B” grade in this section. More importantly, the students demonstrated “very good” organizational skills with the content and were “excellent” at demonstrating the practical applications of the material to the Organic Farming industry. This is definitely the major strength of the SLO 2.3 and is a positive indication that the CRSC 115 students appear to be well prepared and confident for interaction with growers and other personnel involved in organic crop production.  The summary of scores for the **written section** obtained for the twenty-four students enrolled in the course is provided in **Attachment 5.** The mean (± Std. Dev.) grade for the written section of the assignment was 76% (± 11%) with total scores ranging from 49% to 100%. Thirteen of the 24 students scored at least 80% in the written portion of the assignment, which meant that 54% of the students in the course met our expected outcome of attaining a “B” grade. Overall, students performed creditably in the steps 4 and 5 that focused on the formulation of a research question and the ability to relate their topic to interrelationship between organic crop/animal production systems and concepts taught in class. While students were able conduct a search of the relevant databases to obtain peer reviewed articles, they were not consistent with the method of citation and referencing (Step 3). We agreed that the importance of this task should be emphasized in the future and that this technique should be covered in more detail during the library session. Also, the UG Assessment Coordinators unanimously agreed that an additional step should be added in an effort to develop the students’ skills to disseminate the information derived during in exercise in a written format that can be understood by anyone interested in learning about the assigned topic and its relevance to organic crop production. |
| 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.   The CRSC 115 –Research Paper Guidelines for 2018 (**Attachment 5**) were revised as follows:  1. Reduced the PPT time by 1 minute to encourage students to be more concise. This was done in view of today’s fast moving trend where students are encouraged to make “elevator pitches” to potential employers. The next time that this course is offered, students will be reminded to “*treat this presentation as though it was part of a dream job interview and you have been given 5 minutes to provide a seminar on the topic”*.  2. Added a Step 6 to assess the student’s ability to write an informative newspaper article. Students will assume that they have to compile a 425- 450 words article for publication in a section of the “Fresno Bee” or similar newspaper in their hometown. The audience is the public, and they can incorporate as many keywords as possible related to their topic, but avoid simply defining the keywords. Instead, the students will write a coherent and exciting essay with a “catchy” headline on the assigned topic. |
| 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 next assessment will in fact be in **2018-19 AY** and will focus on:  1. SLO 2.2- Quantitative Reasoning- SW104 –Irrigation scheduling  2. SLO 1.4a- Students in the Plant Health option will describe, synthesize and apply methods to manage plant health. We will use Course PLTH 109- Diagnosis and Control of Plant Diseases for assessing this SLO. |
| 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.** From the perspective of the Review Committee, the main challenge of the program was providing the balance between science theory and practical experience. The department should reconsider how to achieve this balance. The reviewers’ recommendation was to increase the focus on the fundamental science that provides the foundation for the applied science.  **Progress** –This recommendation has been a topic of discussion within our department for nearly a decade. Since the reviewers’ report, we have continually addressed this recommendation at meetings throughout the semester. Plant Science Faculty members have long recognized the difficulty with finding a balance between a basic science and an applied practical curriculum. We recognize the importance of preparation in the fundamental life and physical sciences, but unfortunately, the 120 units limit does not provide sufficient room for the additional courses suggested in this review. Alternatively, the Department has now proposed new curriculum that requires students to complete the following fundamental life and physical science courses: CHEM 3A – Intro General Chemistry or CHEM 1A – General Chemistry; CHEM 3B or 8 – Inorganic Chemistry or Inorganic/Biochemistry; BIOL 11 – Plant Biology, or a combination of BIOL 1 – Intro Biology and PLANT 1 – Intro to Plant Science. Students pursuing a research-related career or graduate school do have the option of completing BIOL 161 – Plant Physiology and BIOL 102 - Genetics within the Plant Science major. For those students not directly pursuing such careers we have revised the content of two core Plant Science courses (PLANT 100 - Aspects of Crop Productivity and PLANT 150 – Crop Improvement) to incorporate fundamental concepts in crop physiology and genetics, respectively. As of the Fall 2015 semester, we re-activated a revised version of PLANT 1 that now serves as a bridge between the basic sciences and the applied-practical sciences necessary for plant science majors to succeed in their careers, and we recently created a new course in Molecular Techniques in Plant Sciences. Lastly, we are also exploring the option of requiring students to complete MATH 11 - Elementary Statistics as their B4 lower-division General Education requirement. While we certainly appreciate the site review team’s recommendation, we remain cautious to avoid the risk losing the applied-practical focus of our B.S. in Plant Science. We will continually revisit our curriculum to ensure our students complete their studies and are adeptly prepared for careers in the plant sciences.  **Item 2**. Due to the perception that the farm and real world field experience is not sufficient, it was recommended that the Department should address this perception with a comprehensive review. The Review Committee’s perspective was that change will be difficult since: (a) research farms are not production farms; (b) academic researchers in the department are not commercial growers; (c) faculty time is already stretched thinly; and, d) funding to support farming (tractors, labor, materials) to support a suite of in-depth field classes is limited. The Reviewers suggested conducting an internal analysis to determine how pervasive this perception is and if a problem really does exist.  **Progress-**In our more recent faculty discussions, it is apparent that this may not be as much of an issue as initially perceived. Many of our faculty utilize the university agricultural laboratory as a key component of their courses. For example, our Mechanized Agriculture program provides perhaps the only such university directly hands-on field-based experience in California; our plant health (weed science, plant pathology, and entomology), soils, crop nutrition, and irrigation faculty routinely utilize the existing cropping systems for hands-on learning in their course laboratory sessions (insect-disease scouting, soil fertility, weed management, irrigation system design and installation, etc.). Our production-focused faculty (pomology, olericulture, agronomy, environmental horticulture) regularly utilize the orchards, fields and greenhouse-nursery in their courses (for annual and perennial crop establishment, management, and harvest). Nonetheless, we continue to explore opportunities on how we might strengthen the field, or “real-world” student experiences in partnership with our University Agricultural Laboratory staff, our college’s internship and professional development staff, and our industry advisory committee. We also recognize the difficulties inherent to providing our students with such experiences in what are essentially yearlong production operations within an academic year. This has become readily apparent, as most new production-focused faculty are no longer on 12-month appointments. We are exploring the option of incorporating summer experiences into the applied research programs of those faculty members with related 12-month appointments, and working with our university agricultural laboratory staff to increase year-round on campus field experiences. We are also re-visiting the idea of offering a yearlong course series that specifically provides experience in all aspects crop cultural practices, harvesting, and processing from “seed to sale”. Lastly, we have intensified our efforts to work closely with our University Agricultural Laboratory leadership to re-examine, and perhaps further strengthen, the partnership between the several instructional support technician staff and the department faculty from all disciplines.  **Item 3**. Invest in more faculty lines. The faculty are literally one-deep in many of the courses that need to be taught. There is great untapped potential by faculty to conduct more research. Adding faculty lines would reduce teaching commitments and free up time for research. Support will have to come from the broader agricultural community, as opposed to state funding.  **Progress**- Investing in more faculty lines is an oft-cited recommendation of many program re-views; however, with current and projected enrollment our department is functioning well in most areas. This will likely remain so as long as; 1) vacant positions are filled expeditiously, and 2) we maintain the ability to hire discipline specific part-time faculty to backfill research etc. related release, or planned leaves of absence (sabbaticals, etc.) as necessary. While the faculty expertise are in fact one-deep, adding one-two more faculty in each discipline will not necessarily result in a “program” in such. For example, a program in horticulture often requires at a minimum five-six faculty to adequately deliver required courses, or that there are individual departments of Plant Pathology, Soil Science, or Entomology; each with a core group of discipline-specific faculty. This is the unique nature of a Department of Plant Science(s). Historically our department did indeed have more faculty (e.g. three-four faculty in ornamental horticulture); however, in the absence of a significant investment in multiple positions there would be little benefit from the addition of one faculty line in a discipline. As enrollment increases, or if expectations for faculty to increase research productivity etc. change, investing in more faculty lines within our department will obviously become necessary.  **Item 4.** The existing instructional laboratories are over-subscribed and much of the lab equipment would profit from being upgraded and renewed. The Review panel strongly advised the following: The highest level of prioritization for farm and greenhouse utilization and support should be focused on fulfilling the University mission. Uses that are specific to instruction and research are higher priority than those that are not. 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-**The Department shares this sentiment. However, we also recognize the limitations resulting from lack of funding pervasive throughout California’s higher education system. We are; however, concerned that although of great value, much of the recent investment has been made in research or technology development-focused facilities, and comparatively little has been made to upgrade teaching-focused equipment and facilities necessary to fully achieve the university’s mission to “…boldly educate and empower students for success”. The department faculty also recognize that use of “…high-impact experiences” such as a student research experience is the university’s number one strategic priority. We are also aware of the essentially unfunded mandate that faculty are required to conduct research within the CSU, and that there are some rather significant disparities in how funds are allocated within many of our CSU campuses, or even within our campus' colleges (start-up funds, etc.). Since the last program review, we have continued our efforts to seek some balance between these overlapping missions/priorities in partnership with our university leadership, development team, and industry advisers/partners as we again re-visit our earlier list of specific priority needs. We continue to draft a list of resources and priority needs that fully address the recommendations identified in Item 4, and have submitted these to the Jordan College’s Budget and Resources Committee in early 2016 for review.  **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) then 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.  Please refer to the following attachments:  1. Spring 2016 CRSC 115- Research paper guidelines  2. Rubric for oral PPT portion of research paper assignment  3. Summary of ALL grades for CRSC 115 – Spring 2016- Organic Farming Research Paper  4. Summary of grades for **PowerPoint presentations** of CRSC 115 – Research Paper  3. Summary of grades for **written section** of CRSC 115 – Research Paper  4. Spring 2018 CRSC 115- Revised research paper guidelines |