**Bakersfield College**

**Program Review – Annual Update 2015**

**I. Program Information:**

Program Name: Plant Science AA

Program Type:  Instructional  Student Affairs  Administrative Service

***Bakersfield College Mission****:* Bakersfield College provides opportunities for students from diverse economic, cultural, and educational backgrounds to attain Associate and Baccalaureate degrees and certificates, workplace skills, and preparation for transfer. Our rigorous and supportive learning environment fosters students’ abilities to think critically, communicate effectively, and demonstrate competencies and skills in order to engage productively in their communities and the world.

Describe how the program supports the Bakersfield College Mission:

**The BC Plant Science program is a Career Technical Education (CTE) program. Therefore, the program aligns us with one of the core missions of Bakersfield College, and that is to supply trained individuals to work in vocational jobs of regional agricultural businesses. Plant science supervisory level jobs have increased about 4% in the Bakersfield labor market area from 2014 to 2015. These jobs require a minimum of an associate degree and two years of experience. (EMSI Occupational Change Summary 2014)**

**Although Plant Science is formally a CTE program, all of the course offerings are transferable to the CSU and/or UC system and the program also offers general education credit for three of the six major courses. Therefore, Plant Science also meets the third Budget Decision Criteria for transfer.**

**The closest competing school with a Plant Science program is over 70 miles away at College of Sequoias (COS) in Visalia. Porterville College has a small agriculture program and we work very closely with them regarding curriculum needs within our district. We have the only plant science program in Kern County, which is the third leading county in the United States in value of agricultural production (USDA Agricultural Statistics Summary 2012).**

Program Mission Statement:

**The mission of the Bakersfield College Agriculture Department Plant Science Program is to provide pertinent state-of-the-art education for vocational and transfer students in order to produce skilled plant science professionals for the industry, both public and private.**

**II. Progress on Program Goals:**

1. List the program’s current goals. For each goal (minimum of 2 goals), discuss progress and changes. If the program is addressing more than two (2) goals, please duplicate this section.

|  |  |  |  |
| --- | --- | --- | --- |
| **Program Goal** | **Which institutional goals from the Bakersfield College Strategic Plan will be advanced upon completion of this goal? (select all that apply)** | **Progress on goal achievement**  **(choose one)** | **Comments** |
| 1. **To obtain a new Plant Science lab containing state of the art equipment** | **1: Student Learning**  **2: Student Progression and Completion**  **3: Facilities**  **4: Oversight and Accountability**  **5: Leadership and Engagement** | **Completed: \_\_\_\_\_\_\_\_\_\_ (Date)**  **Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**  **Ongoing: \_\_8/27/15\_ (Date)** | **Although the BC Agriculture building was repaired, no new lab or classroom space was provided for any program. In order for the Plant Science program to grow, we need a good, new, and larger plant science lab or labs. We have been told that this request cannot be considered under the current financial situation, but that our request could be considered if a new construction bond passes in the near future. There are no grants available to support facilities construction. In the meantime, we have developed a detailed plan for the facilities that we need and will continue to work with our advisory board to make sure that our request is at the top of the list when monies become available. Upon completion of the new facilities, there should be more Plant Science students completing all Plant Science lab courses and the success rate should be higher in those courses.** |
| 1. **To increase the number of students majoring in Plant Science** | **1: Student Learning**  **2: Student Progression and Completion**  **3: Facilities**  **4: Oversight and Accountability**  **5: Leadership and Engagement** | **Completed: \_\_\_\_\_\_\_\_\_\_ (Date)**  **Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**  **Ongoing: \_\_8/27/15\_ (Date)** | **We have made significant progress in increasing the number of plant science majors (see Trend Data). The latest data from IRP shows that for fall 2015, there are 80 registered plant science majors, up from 30 majors in 2010. We believe that this has resulted from our growing outreach program with local high schools with FFA programs. We have greatly increased our involvement with those programs by increasing the number of hosted FFA contests and working with our advisory committee that contains a larger number of high school agriculture teachers than ever before. We are also working with the Paramount Farm Academy to develop a dual enrollment program in plant science which should result in more students entering our program in the future. However, because of lack of funding and time, we have not been able to initiate the one-on-one recruitment program (*Personal Communications Program*)for plant science students. Also, because of lack of lab facilities, we have not been able to expand many of the plant science classes, either new courses or number of sections, or student numbers within a section.** |

1. List new or revised goals (if applicable)

|  |  |  |
| --- | --- | --- |
| **New/Replacement Program Goal** | **Which institutional goals will be advanced upon completion of this goal? (select all that apply)** | **Anticipated Results** |
| 1. **Completely remodel the Plant Science program to include only an AS-T, AS, and CA.** | **1: Student Learning**  **2: Student Progression and Completion**  **3: Facilities**  **4: Oversight and Accountability**  **5: Leadership and Engagement** | **This will be a more streamlined and shorter pathway for students to achieve employment goals in the industry, which will lead to higher completion and employment numbers and rates.** |

**III. Trend Data Analysis:**

Highlight *any significant changes* in the following metrics and discuss what such changes mean to your program.

**There are no significant changes since last year to any of the *Trend Data* parameters. There was a slight drop in Plant Science enrollment because Crops B2 is only taught every other year and was not taught in spring 2015. Other than that, the trends all held steady and are generally good with a slow increase in FTES and number of majors, and a steady success rate of around 80%.**

1. Changes in student demographics (gender, age and ethnicity). **No significant changes**
2. Changes in enrollment (headcount, sections, course enrollment and productivity). **No significant changes**
3. Success and retention for face-to-face, as well as online/distance courses. **No significant changes**
4. Changes in the achievement gap and disproportionate impact (Equity). **No significant changes**
5. Other program-specific data that reflects significant changes *(please specify or attach).* All Student Affairs and Administrative Services should respond.

**IV. Program Assessment (focus on most recent year):**

* 1. How did your outcomes assessment results inform your program planning? Use bullet points to organize your response.

1.Demonstrate *managerial and leadership* abilities for plant science majors that will enhance opportunities for employment and success in the agriculture industry in the

21st century.

*Assessment:* Track student success rates for plant science majors using IRP data for the courses listed in the matrix for this PLO.

**According to the latest IRP data, about 82% of the students who attempted the Agri B49 courses (leadership) succeeded with a “C” or better. This is a little**

**better than the 80% from the last review cycle.**

2. Master skills needed for baccalaureate level education or obtain a certificate in plant science at B.C.

*Assessment:* Track A.A., A.S., Certificate, and transfer rates for plant science from Datamart, IRP, and Perkens IV databases.

**The total BC Plant Science awards (AA, AS, CA) went up from eight to nine from 2014 to 2015. This is a graduation rate of only about 30% for a two year**

**period. However, many students take more than two years to graduate. Calculating reliable graduation rates of Plant Science students is hard because the**

**number of majors has been increasing rapidly in the last five years and many of those students are part time. Also, graduation numbers have fluctuated**

**wildly from year to year, from a low of one in 2012 to a high of nine in 2015.**

3. Demonstrate specific skills within the plant science discipline needed for employment.

**The success and retention rates of students in plant science courses have been and continue to be higher than the average of the college. The average**

**success rate of students in plant science courses has remained at about 80% while college wide it is about 69%. The average retention rate of students in**

**plant science courses has remained at about 90% while college wide it is about 86%.**

* 1. How did your outcomes assessment results inform your resource requests? The results should support and justify resource requests.

**1) There are now 60 students majoring in plant science at BC. Although the numbers have increased over the past five years, we feel that there should be many more majors given that there are more than 100 new and replacement plant science jobs open in the area each year according to the EMSI data for 2014. Because of this, one of our continued requests is for funding for outreach activities, including hosting FFA contests and open house days for regional high schools. We know that there is a perception by locals, especially the children of farm laborers, that work in any field of agriculture leads to a life of low pay and drudgery. We will continue to try and promote the fact that modern plant scientists are highly educated and well paid.**

**2) We need to find out why our graduation rates in plant science are so low. We should be graduating 20 to 30 students each year, but only graduate less than half of that number on a good year. We feel that the answer to this problem is to develop a program of individual counseling for the plant science students where we scrutinize and alleviate, as much as possible, their individual reasons for failure. We are still trying to develop a *Personal Communications Program* as per the 2014 APR and part of this program would be individualized counseling.**

* 1. How do course level student learning outcomes align with program learning outcomes? Instructional programs can combine questions C and D for one response (SLO/PLO/ILO).
  2. How do the program learning outcomes or Administrative Unit Outcomes align with Institutional Learning Outcomes? All Student Affairs and Administrative Services should respond.

**We are in the process of mapping all plant science (CRPS) course SLOs. We have finished mapping five out of eight courses. An example is given below:**

**Crops B10 Plant Biology**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Student Learning Outcomes or AUO**   1. **The student will be able to describe the kingdoms studied in classical botany (plant biology) and name at least five practical products derived from plants.** 2. **The student will be able to properly use the compound and dissecting microscope as tools for studying organisms and cells in plant biology.** 3. **The student will be able to identify basic plant cell structures from pictures, drawings, or prepared slides and outline the phases of the cell cycle, including mitosis.** 4. **The student will be able to name the major plant tissues and relate the functions of each.** 5. **The student will be able to identify structures of roots, stems, leaves, flowers, fruits, and seeds from pictures, drawings, or prepared slides.** 6. **The student will be able to name the major biochemical pathways involved in photosynthesis and respiration and identify those pathways from drawings. The student will be able to compare and contrast photosynthesis and respiration regarding inputs, products, and time and place of occurrence.** 7. **The student will be able to name and list the major functions of the five classes of plant hormones and use those hormones to produce laboratory demonstrations of their functions.** 8. **The student will be able to use basic Mendelian genetics to calculate genotypic and phenotypic ratios of progeny from hybrid crosses. The student will be able to name, draw, and identify from prepared slides the eight**   **phases of meiosis.**   1. **The student will be able to use basic plant propagation techniques to multiply plants from root, stem, and leaf cuttings in a greenhouse.**   **10. The student will be able to name and list the characterizing traits of the five major kingdoms and identify typical organisms in each kingdom. The student will be able to name and list the characterizing traits of three major plant divisions and identify typical organisms in each division. The student will be able to place living or pictorial specimens of plants in one of eleven major plant families.**  **11. Use basic scientific procedures to design and implement an experiment to solve a simple question in plant biology.** | **Measure** | **PLO** | **ILO** | **GE** |
| Exam | 2,3 | I II III | **B.1.1** |
| Lab report scored by a rubric | 2,3 | I II III | **B.1.1** |
| Exam and lab report scored by a rubric | 2,3 | I II III | **B.1.1** |
| Exam | 2,3 | I II III | **B.1.1** |
| Exam | 2,3 | I II III | **B.1.1** |
| Exam | 2,3 | I II III | **B.1.1** |
| Exam | 2,3 | I II III | **B.1.1** |
| Exam | 2,3 | I II III | **B.1.1** |
| Pass / fail lab  Exam    Team experimental write‐up scored by a rubric | 2,3  2,3    1,2,3 | I II III  I II III    I II III IV | **B.1.1**  **B.1.1**    **B.1.1**  **B.1.2** |

**PLOs**

1. **Demonstrate managerial and leadership abilities for plant science majors that will enhance opportunities for employment and success in the agriculture industry in the 21st century.**
2. **Master skills needed for baccalaureate level education or obtain a certificate in plant science at Bakersfield College.**
3. **Demonstrate specific skills within the plant science discipline needed for employment.**

# ILOs:

* 1. **Think critically and evaluate sources and information for validity and usefulness.**
  2. **Communicate effectively in both written and oral forms.**
  3. **Demonstrate competency in a field of knowledge or with job‐related skills.**
  4. **Engage productively in all levels of society – interpersonal, community, the state and nation, and the world.**

**GELOs: *B.1. Natural Sciences***

## Demonstrate a knowledge of natural phenomena and recognize the processes that explain them.

1. **Demonstrate a knowledge of scientific methodologies when solving a problem.**
2. Describe *any significant changes* in your program’s strengths since last year.

**The number of majors has grown moderately and the number graduating has greatly increased. This has probably resulted from increased outreach activities with the local high schools plus counseling of students in our Agri B1 courses aimed specifically to get our students ready to graduate.**

Describe *any significant changes* in your program’s weaknesses since last year.

**Because of the greater number of students in every one of my program’s classes, the need for a plant science lab is now more important than ever. We are packing 34 students in Agriculture room #9 that really has lab seats for 30 students, but no real lab stations with independent electrical outlets for microscopes or vacuum for soil analysis or room for lab supplies. Also, our budget for the Plant Science program has not increased in 15 years. We receive measly $1000 in funding for a whole year of almost exclusively lab classes plus maintenance of the Ag Farm Lab. With the increase in sections and student numbers per section, this amount is absolutely unsatisfactory.**

1. If applicable, describe any unplanned events that affected your program. N/A

**V. Assess Your Program’s Resource Needs:** To request resources (staff, faculty, technology, equipment, budget, and facilities), please fill out the appropriate form. <https://committees.kccd.edu/bc/committee/programreview>

1. Human Resources and Professional Development:
2. If you are requesting any additional positions, explain briefly how the additional positions will contribute to increased student success. Include upcoming retirements or open positions that need to be filled. N/A
3. Professional Development:
4. Describe briefly the effectiveness of the professional development your program has been engaged in (either providing or attending) during the last year, focusing on how it contributed to student success.

**We hosted the 2014 Bakersfield Agricultural Summit with about 300 attendees for a one day session of speakers like Congressman Kevin McCarthy**

**and State Senator Jean Fuller on topics relating to current agricultural issues in Kern County, especially the drought situation. Although tickets were**

**$75 per person for the general public, we hosted many of our students through industry donations. Our students were able to network with many local**

**ag business leaders at the conference, especially those that purchased tickets for the students.**

**We attended the state and regional CATA conferences where we planned statewide agricultural curriculum, especially the new AS-T degrees, and**

**worked on standardizing course content so that courses can be easily transferred from the CCs to the universities. We also planned for the CC yearly**

**student leadership conferences and for extensive recruitment activities for the coming year.**

1. What professional development opportunities and contributions can your program make to the college in the future?

**We will be hosting the 2015 California Agricultural Leadership Contest where students from all of the California colleges and universities with**

**agriculture programs come together to learn about leadership aspects of the agriculture industry and to compete in leadership contests such as**

**speaking contests and debates.**

**We regularly attend all opening day and many FLEX week activities every year and made two presentations at FLEX week activities this year.**

1. Facilities:
2. How have facilities’ maintenance, repair or updating affected your program in the past year as it relates to student success?

**This has been the first full year of having the agriculture building ceiling, walls, and floors repaired and rooms updated with new multimedia equipment. Students, faculty, and staff have a much more positive attitude toward working in a building that has floors without loose tiles and roofs that do not leak. But more importantly, the new multimedia equipment and electrical outlets in the lab room has allowed us to present visual material more efficiently to students and for each student to have access to more equipment like the microscopes. It is too early to know if there is a significant increase in student success in the lab classes, but I know that the success rate for some lab exercises in my plant biology course has increased.**

1. How will your Facilities Request for next year contribute to student success?

**We request new lab facilities every year (see Program Goal #1). We desperately need a new plant / soil science lab that can seat 34 students with room for students to move around the room to obtain the equipment and supplies needed for the lab exercises. The best example would be modeled after the BC biology labs, with separate tables for teams of two students at each table. At present, we have three or sometimes even four students sharing lab equipment which makes for a very poor learning experience. We believe that having more space, equipment, and supplies will allow for much smaller group sizes which will result in more of a real hands-on experience** **for each student which will result in a better learning experience. Also, news of our relatively poor facilities has gotten around the high schools in Bakersfield, possibly causing prospective plant science students to go elsewhere, like COS or Reedley.**

C. Technology and Equipment:

1. Understanding that some programs teach in multiple classrooms, how has new, repurposed or existing technology or equipment affected your program in the past year as it relates to student success?

**We received “smart boards” in two of our classrooms last year. We cannot really say that that technology has contributed to student success, at least not yet, since we have not fully integrated it into our lectures or labs. However, we can say that the short throw projector systems has contributed to more room space because the instructor can work closer to the boards allowing for more space for students, which has helped somewhat mitigate the overcrowded lab problems.**

1. How will your new or repurposed classroom, office technology and/or equipment request contribute to student success?

**We are requesting a new 24 passenger bus for use by all of the programs in the agriculture department, including plant science. In just plant science, we use the old bus for soils, vegetable production, and crop production labs. However, the old bus only holds 20 students and, more importantly, has 120,000 miles on it and is breaking down regularly. We absolutely have a need for field trips so that our students can be exposed to the newest innovations in the agriculture industry. This is especially true since we do not have a large and well stocked farm containing the newest equipment and technology.**

1. Discuss the effectiveness of technology used in your area to meet college strategic goals.

**1. Student learning – The newest technology that is used in plant science is generally very expensive; GPS driven tractors, plant cell culture labs, gas chromatographs for soil and plant analyses, and much more. We have very little of this equipment, but we do have the cheaper versions of machinery that can do the same thing and, as long as the bus holds up, we can visit businesses that do have the newest and most expensive equipment available. For example, we can at least introduce our students to plant cell culture with our small laminar air flow hood, have them use a GPS guided monitor to drive a tractor, and use a selective ion meter to measure soil fertility parameters.**

**2. Student progression and completion – Because every one of our plant science courses have large lab components, we have only been able to adapt three of them as on-line or at least hybrid courses and we can only do this by offering optional field labs. However, those courses have been very successful; the fill rates are very good and the success rates are at 72%, which is well above the college average. Many of the on-line students are full-time workers from remote areas that could not otherwise take the courses.**

**Also, we are constant users of the *Early Alert* system and it has worked very well. About half of the students we notify of scholastic problems catch up and/or improve their grades.**

D. Budget: Explain how your budget justifications will contribute to increased student success for your program.

**The total GU budget for the BC Plant Science program is only $1,000 per year and that is supposed to cover summer courses too. Out of that comes**

**money for all of the supplies for the labs and even for repair and maintenance of the Ag Farm Lab. There is not enough money to have the supplies**

**necessary to be able to have small lab teams that are conducive to learning. We are a very “hands on” oriented program with students who need**

**that type of learning to stay engaged. We need to have lab teams of only two students, not three or four students, so that every student will have a**

**chance to use the materials and machinery that goes with it, such as soil water vacuum extractors or selective ion meter analysis or even model**

**building using paper, pipe cleaners, and tape.**

**VI. Conclusions and Findings:**

Present any conclusions and findings about the program. This is an opportunity to provide a brief abstract/synopsis of your program’s current circumstances and needs.

**1. The Plant Science program is growing in student numbers and number of awards, but still needs to increase those numbers.**

**2. The Plant Science program has relatively high success and retention rates.**

**3. The Plant Science program has a need for more laboratory space and more equipment so each student can have better access to the tools**

**necessary to learn.**

**4. The Plant Science program will develop a *Personal Communication Program* to help increase award numbers by instituting much more one-on-one**

**advising with students regarding their problems in completing their certificates and degrees.**

**5. The Plant Science program is developing a state mandated AS-T program which should be in place by fall 2015.**

**VII. Forms Checklist (place a checkmark beside the forms listed below that are submitted as part of the Annual Update):**

[Best Practices Form](http://committees.kccd.edu/bc/committee/programreview) **(Required)**

Curricular Review Form **(Instructional Programs Required)**

[Certificate Form](http://committees.kccd.edu/bc/committee/programreview) **(CTE Programs** **Required)**

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[Faculty Request Form](http://committees.kccd.edu/bc/committee/programreview)  [Classified Request Form](http://committees.kccd.edu/bc/committee/programreview)  [Budget Form](http://committees.kccd.edu/bc/committee/programreview)

Professional Development Form  [ISIT Form](http://committees.kccd.edu/bc/committee/programreview)  [Facilities Form](http://committees.kccd.edu/bc/committee/programreview) (Includes Equipment)

Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_