Bakersfield College
Program Review – Annual Update

Program Name: **Plant Science**

Program Type: ☒ Instructional ☐ Student Affairs ☐ Administrative Service ☐ Other

***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 designed for those students who wish to go directly to work in the local agricultural industry or transfer to a four-year institution upon graduation from BC. All of the course offerings are transferable to the CSU and/or UC system and the program offers general education credit for three of the six major courses. The program demands all of the courses in the plant science discipline plus the general education required by local area employers for immediate work in the industry (see attached fall 2015 Advisory Board minutes). There were 3,627 jobs in Kern County in plant science in 2016 with an expected increase of 4.5% over the next five years and an average pay of $28.70 per hour *(EMSI Occupation Overview 2017)*. Most of the higher paying jobs require a bachelor's degree in plant science. Also, according to CalAgCC, there will be an 8.1% increase in plant and soil science jobs from 2013 to 2018 in California with and the average annual salary for those jobs is $53,630 (www.calagcc.org).**

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.**

Instructional Programs only:

A. List the degrees and Certificates of Achievement the program offers
   AS-T, AS, CA
B. If your program offers both an A.A. and an A.S. degree in the same subject, please explain the rationale for offering both and the difference between the two. **N/A**
C. If your program offers a local degree in addition to the ADT degree, please explain the rationale for offering both.
   This is a CTE program. Local industry has told us they want employees with an associate's degree, including general education, but with more units in the plant sciences than is needed for the AS-T. (see fall 2015 Advisory Board minutes)

Progress on Program Goals:

A. 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. Please provide an action plan for each goal that gives the steps to completing the goal and the timeline.

Program Goal	Which institutional goals from the Bakersfield College Strategic Plan will be advanced upon completion of this goal?	Progress on goal achievement (choose one)	Status Update – Action Plan
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: **9/1/17** (Date)	**The BC Agriculture building was repaired in 2014. However, we need new lab space with modern equipment to accommodate our growing student numbers and to be able to teach to industry standards. The Measure J bond has passed and we will assemble a committee this fall to work with an architect to draw up plans for the new agriculture building. However, we are not sure if the allocated $12 million will be enough to build new labs from the ground-up as is shown in the plans.**
2. 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: **9/1/17** (Date)	**We have had a setback in our trend over the last five years of consecutive increases in the number of students majoring in plant science. The latest data from IRP shows that the number of plant science majors has dropped from 76 in 2015 to just 52 this semester (fall 2017). After speaking with about 12 of the students who dropped out of the program (see 2016 APR), most of the students said that the drought and other economic factors led them to believe that there will not be jobs available when they graduate.**

			We need to get the word out that there <u>are</u> still jobs in local agriculture for certificated personnel.
3. 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**	☒ Completed: **9/1/17** (Date) ☐ Revised: _____ (Date) ☐ Ongoing: _____ (Date)	**Our new Plant Science AS-T has been approved by the state and is part of the 2017-18 catalog. The AA in Plant Science has been officially terminated. This goal is completed.**

B. 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)	Status Update – Action Plan	Time for Completion	Lead Person
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	**Measure J has passed and we will receive $12 million for the new agriculture building. We are building a committee of agriculture instructors, the dean, and the department chair to work with the state architect to outline plans for the new building. We must include a new Plant Science lab in the building that can safely hold up to 32 students. In addition, much of the new equipment needed could come from the new *Strong Workforce* grant. I will be applying for grant monies to obtain new instrumentation for Soil B1, Crops B1, and Crops B5 (see *Other Equipment Request Form*).**	**Spring 2018**	**Greg Cluff Lindsay Ono**

2. 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	**The drought has definitely eased since last year and the agricultural economy is hiring again. We are planning a "BC Ag Open House" for February 2, 2018. We will invite agriculture students from all regional high schools for a day of learning about the BC Agriculture programs. We will have presenters from industry representing each of the disciplines, including Plant Science.**	**Spring 2018**	**Greg Cluff Lindsay Ono**

3. To build the following single program system for crops and horticulture: **Plant Science:** **Crops Emphasis: AS-T, AS, CA** **Horticulture Emphasis: AS-T, AS, CA**	☐ 1: Student Learning ☒ 2: Student Progression and Completion ☐ 3: Facilities ☐ 4: Oversight and Accountability ☐ 5: Leadership and Engagement	**The state has mandated the development of the AS-T in Plant Science wherein horticulture has been combined with crop science, sharing a common core curriculum. Almost all California community colleges have developed the AS-T and have merged their horticulture and crops programs for the AS and CA. Students will still be directed into a horticulture or crops <u>pathway</u> by taking somewhat different electives. These pathways will be outlined in the college catalog.**	**Fall 2018**	**Greg Cluff Lindsay Ono**

<u>Best Practices:</u>

Programs often do something particularly well; usually they have learned through assessment – sometimes trial and error – what solves a problem or makes their programs work so well. These are often called Best Practices and can help others. Please share the practices your program has found to be effective.

1. Continual communication with regional high school agriculture programs, including active membership in the *California Agriculture Teachers Association* with two regional and two statewide meetings per year where we discuss plant science curriculum, recruitment, and program development.

2. Continual upgrading of courses with latest equipment for a better hands-on learning experience in labs.

3. Continual communication with students via e-mail, phone, *Canvas*, and *Early Alert*. I have found that use of these types of interventions has resulted in about 50% of the poor performing students at the beginning of the semester obtaining a "C" or better in my classes.

Program Analysis:

Take a look at your trend data (all programs should have some form of data that is used to look at changes over time).

1. Please report on any unexpected changes or challenges that your program encountered this cycle:

   1) The unduplicated headcount drastically increased from 272 to 332 (22% increase) in 2015-2016 ending four years of essentially flat growth. This increase does not count our brand new dual enrollment students because those classes started in fall 2017. However, we did add a third section of Crops B5 in fall 2016, so that must be a partial reason for the increase in the headcount.

   2) 95% of plant science students completed their educational plans compared to 75% for Bakersfield College as a whole. This is probably because we direct all agriculture majors into our Agri B1 course where doing the educational plan is a mandatory part of the curriculum.

   3) As was said above, the number of plant science majors has dropped from 76 in 2015 to just 52 this semester (fall 2017).

2. How does your trend data impact your decision making process for your program?

   1) The decrease in the number of plant science majors has caused us to put more effort into recruitment for the program. We are working very closely with local high schools, especially those with agriculture programs, to educate the students as to the importance of obtaining a college degree in order to get a good job in an agricultural field. We are also advertising the good job outlook for those with degrees in plant science. We are hosting an open house this year that will be paid by the Strong Workforce grant to not only recruit high school students, but to advertise our program the undecided BC students.

3. Were there any changes to student success and retention for face-to-face, as well as online/distance courses?

   There is a large gap in the course success rate of plant science face-to-face courses (83%) vs. on-line courses (69%). However, there are only three on-line courses in plant science. Much of the low success rate is probably due to the low success rate of one of our on-line plant science courses that was taught by an adjunct professor. That professor no longer teaches at BC and the course is now being taught by a regular full-time instructor that will be able to communicate more often with the students. We believe this will significantly raise the success rate of our on-line plant science courses.

4. Were there any changes to student demographics (age, gender, or ethnicity) for the past cycle?

   1) For the first time in the history of the program, females outnumbered males (54% to 45% with 1% unreported). This mirrors the national trend in agricultural education in general.

   2) The percentage of Hispanic students in the program has increased every year to be 66% of the total in 2015 – 2016. This mirrors the college trend for the general student population.

Resource Request and Analysis:

Resource Request		If Fulfilled, Discuss How Previous Year's Requests Impact Program Effectiveness?
Positions: *Discuss the impact new and/or replacement faculty and/or staff had on your program's effectiveness.*	☒ 1: Classified Staff ☐ 2: Faculty	**Not fulfilled**
Professional Development: *Describe briefly, the effectiveness of the professional development your program has been engaged in (either providing or attending) during the last cycle*	☐ 1: Provided Professional Development ☒ 2: Attended Professional Development	**1) We regularly attend the state and regional California Agriculture Teachers Association (CATA) conferences where we plan statewide agricultural curriculum, especially the new AS-T degrees, and work on standardizing course content so that courses can be easily transferred from the CCs to the universities.** **2) We regularly attend flex week activities and other FLEX related symposiums and seminars and workgroups offered at the college, including those related to student success such as "Student Pathways", "MIH", and "Equity".** **3) We regularly attend CTE meetings to help us meet our "core indicators" such as student success, retention, and employment.**
Facilities: *If your program received a building remodel or renovation, additional furniture or beyond routine maintenance, please explain how this request or requests impacts your program and helps contribute to student success.*	☐ 1: Space Allocation ☐ 2: Renovation ☐ 3: Furniture ☐ 4: Other ☒ 5: Beyond Routine Maintenance	**Again, Measure J has passed and a new $12 million agriculture building will be completed in the next six years. We are just starting the process of meeting with an architect to plan the new building. For the plant science program, we know that we will need a new state of the art lab facility and new greenhouse facility.** **We do not have a plant science laboratory. We have "Agriculture Room 9" that serves mostly as a classroom with tables and electrical plugs for microscopes. This does not allow each student to use one microscope (two or three students must share each microscope). In addition, there is not enough floor space for students to move safely from the equipment holding areas back to their tables. There are no vacuum outlets for doing soil-water extraction work. There are no locking cabinets to hold microscopes or other valuable equipment. There are no fume hoods to vent noxious gasses from doing chlorophyll extractions with ethanol or similar plant physiology work.** **We do not have a working greenhouse. The present structure cannot be adequately cooled in the summer or heated in the winter to grow plants needed for laboratory work. There is no automated watering or lighting systems and lighting is inadequate to grow any plants during the winter. There is no secure door locking system, so that supplies are often stolen out of the greenhouse.**

Technology: *If your program received technology (audio/visual – projectors, TV's, document cameras) and computers, how does the technology impact your program and help contribute to student success?*	☐ 1: Replacement Technology ☐ 2: New Technology ☐ 3: Software ☐ 4: Other_____	**The program did not receive any new technology in the last year.**
Other Equipment: *If your program received equipment that is not considered audio/visual or computer equipment technology, please explain how these resources impact your program and help contribute to student success.*	☐ 1: Replacement ☒ 2: New ☐ 3: Other_____	**The program received a grant for $1,800 from the *Central Valley CTE Consortium* for bioclimatology equipment for Crops B5. The equipment is used for a particular lab, which covers crop temperature, wind speed, solar radiation, relative humidity, soil water, and soil temperature. The lab is required by the COR for the course.** **The program has also received a $10,000 VTEA grant to upgrade lab equipment for soil and plant science courses. The monies will be spent this year to purchase new selective ion probes for soil chemistry work and to repair and purchase microscopes so that each student can have access in labs to their own scope.**
Budget: *Explain how your budget justifications will contribute to increased student success for your program. (Fiscal requests will be submitted by the faculty chair and/or area administrator.)*		**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. This is not enough money for 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 building models using paper, pipe cleaners, and tape. The budget needs to be at least double the amount.**

Conclusions & Snapshot:

Present any conclusions and findings about the program. This is an opportunity to provide a brief abstract or synopsis of your program's current circumstances and needs. Consider this a snapshot of your program, if someone were to only read this portion of your annual program review.

The *Plant Science* program is growing. The FTES has grown dramatically in the last five years. The number of majors has grown until the last two years (2016, 2017) and then decreased slightly. We are addressing this decrease in majors with concerted recruitment efforts. Our success rate is much higher than the college in general.

We need new classrooms and labs. We were allotted $12 million in *Measure J* funds for this purpose. We are beginning the planning process this semester by forming a committee to work with the architect. However, it will be at least six years until the project is completed and we probably need more than the allotted $12 million.

Our new AS-T in *Plant Science* has been accepted by the state and it is now in the 2017-18 college catalog. We are renovating our curriculum to merge the *Ornamental Horticulture* program with the *Plant Science* (*Crops*) program. We hope to renumber the courses to all start with the state standard PLSC prefix. Each student will take a core curriculum followed by a *Crops* or *Horticulture* pathway.

We are in need of a consistent supply budget of at least $2,000 per year to cover materials used by students in labs and to purchase supplies for the *Agriculture Farm Laboratory.*