

# Bakersfield College 2018-2019 Program Review – Annual Update

Program Name: Physics AS-T

**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:** We primarily offer transfer level courses designed to satisfy the needs of science, engineering, computer science and architecture majors, allied health students, college general education requirements, and liberal studies teacher credential programs. Through our transfer degree, we provide a reliable means of transferring to four-year institutions in continuation of advanced degrees in fields requiring a rigorous background in physics and/or astronomy. In our courses we provide a rigorous and supportive learning environment to think critically in solving problems using logical reasoning and to communicate their knowledge and experiment results in a logically, coherent way. Community outreach efforts comprise a smaller, yet still important, part of the work we do.

Because the Astronomy courses are for the general education program only and are not part of the Physics degree, this program review will be divided into two parts for each question: (1) the astronomy courses and planetarium and (2) the physics courses leading to the Physics AST degree. Based on education and career goals articulated by students on a form the students fill out on the first day of astronomy classes each semester for the past ten years or so, over 95% of the students taking the astronomy courses are non-STEM majors and are not on a Physics pathway in any way shape or form. For purposes of the college's program review process, astronomy is put under the physics umbrella to provide a venue for evaluating the astronomy offerings and needs. We will clearly distinguish between the astronomy and physics parts in the rest of this form.

## ***Instructional Programs only:***

- A. List the degrees and Certificates of Achievement the program offers
- 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.
- C. If your program offers a local degree in addition to the ADT degree, please explain the rationale for offering both.

## **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.

### **1. Program Goal: Discipline promotion**

#### **List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(Student Learning, Student Progression and Completion, Facilities, Leadership and Engagement)

Student Learning, Leadership and Engagement

**Progress on goal achievement:** Ongoing.

**Status Update – Action Plan and any link to Resource Requests:**

Physics Olympics, Planetarium programs, STEM Completion Coaching, BC-CSUB Summer Research Program, participation in Chemistry Rocks and  $\pi$  day for STEM promotion

2. **Program Goal:** Improve professional development through training in areas specific to STEM and pedagogy

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(1. Student Learning, 2. Student Progression and Completion, 3. Facilities, 4. Leadership and Engagement)

Student Learning, Student Progression and Completion

**Progress on goal achievement:** Ongoing.

**Status Update – Action Plan and link to Resource Requests**

Online teaching training, International Planetarium Society Meeting (France)

Financial resources are needed for off-campus professional development each year.

3. **Program Goal:** Develop understanding on how to use data analytics to improve student success

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(2. Student Learning, 2. Student Progression and Completion, 3. Facilities, 4. Leadership and Engagement)

Student Learning, Student Progression and Completion

**Progress on goal achievement:** Ongoing.

**Status Update – Action Plan and link to Resource Requests**

Training with eLumen for assessment data.

More training with Starfish for student tracking.

4. **Program Goal:** Hiring of Lab Technician

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(3. Student Learning, 2. Student Progression and Completion, 3. Facilities, 4. Leadership and Engagement)

Student Learning, Student Progression and Completion, Facilities

**Progress on goal achievement:** Ongoing.

**Status Update – Action Plan and link to Resource Requests**

Lab technician still needed. See the classified position request form.

5. **Program Goal:** Creating online Physics B2A&B course. Creating online Astr B2 course.

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(4. Student Learning, 2. Student Progression and Completion, 3. Facilities, 4. Leadership and Engagement)

Student Learning, Student Progression and Completion

**Progress on goal achievement:** Completed.

**Status Update – Action Plan and link to Resource Requests**

PHYS B2A and ASTR B2 are being offered online.

6. **Program Goal:** Increase number of technology-based labs

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(5. Student Learning, 2. Student Progression and Completion, 3. Facilities, 4. Leadership and Engagement)

Student Learning, Student Progression and Completion

**Progress on goal achievement:** Ongoing.

**Status Update – Action Plan and link to Resource Requests**

Request for technology will be made again.

- B. List new or revised goals (if applicable)

**Program Goal:** Continuous assessment cycle for physics course SLOs.

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?**

(Student Learning, Student Progression and Completion, Facilities, Leadership and Engagement)

Student Learning, Student Progression and Completion

**Progress on goal achievement:** NEW

**Status Update – Action Plan and link to Resource Requests:**

Physics faculty will adjust the assessment cycle towards evaluating 1-2 SLOs per semester so that data tracking of outcomes is more current and reliable. This will also allow us to more clearly observe trends over time.

**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). *All programs will answer the following questions unless otherwise indicated.*

1. Please report on any unexpected changes or challenges that your program encountered this cycle:  
Not in the past cycle for both Physics and Astronomy.
2. How does your trend data (or other data your area collects) impact your decision making process for your program?  
We will continue to encourage engineering and computer science students to graduate with an AS-T in physics since the courses align well between programs. We can offer a large number of sections but also offer flexibility in scheduling
3. Evidence of Department Dialog of data
  - If you have had time to review and discuss your program's data with members of your department, attach documentation of your discussion. Documentation can come in the form of minutes from meetings or retreats, email dialog or any other ways that show substantive discussion.  
Nick Strobel, Gilbert Ayuk, Tim Plett, and Brent Wilson met on 9/7/2018 from 12:00pm – 2:00pm to complete this program review packet. See attached documentation of email invite.
4. Were there any changes to student demographics (age, gender, or ethnicity) for the past cycle?  
Not in the past cycle for both Physics and Astronomy.
5. Were there any changes to student success and retention rates for face-to-face and online courses? (instructional only)  
Not in the past cycle for both Physics and Astronomy.
6. Equity gaps
  - Please look for large differences, or gaps, between top performing groups and others. Consider how you could identify the reasons behind these gaps, and if there changes that could be made to reduce them. For in depth review of equity issues, and on changes that are being made campus-wide, please refer to the current [Bakersfield College Student Equity Plan](#).

Ethnicity, gender, and age don't appear to have any significant gaps.

7. Please describe any recent achievements of your department, including but not limited to faculty who have won awards or distinctions, new projects your department has implemented, professional development work, professional conference presentations or recently published work.

Rick Darke received the Shirley Trembley award in excellence of teaching for the 18-19 academic year.

Nick Strobel was the ISER editor and was recognized by the BC President for that task.

Tim Plett participated in the BC-CSUB Summer Research Program and directly collaborated with CSU Bakersfield faculty during Summer 2018.

8. The college has embarked on significant efforts such as **Guided Pathways**, **affinity groups** and **completion coaching communities** to improve the success and completion rates of our students. Please describe what your program/department/office is doing to contribute to these efforts.

STEM Completion Team work.

9. Explain your role if you are involved in Dual Enrollment, Inmate Education, or Rural Initiatives.

We are not involved with inmate education or rural initiatives at the present time.

### **Analysis of Received Resources from Previous Cycle**

**Discuss the type of resources you received and their Impact on program effectiveness?**

#### **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

#### **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 – All-dome video projection system will be installed in October to replace very old equipment. This will make the content more engaging in astronomy courses.

3: Software

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

#### **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.*

Physics lab equipment of about \$21,000 was received for the Delano campus for teaching and to increase outreach to our Delano students.

### **Conclusion:**

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.

Courses offered by Physics and Astronomy faculty satisfy requirements for the Physics major, Engineering major, Chemistry major, Biology major, Computer Science major, as well as, General Education (area B.1) requirements for all degrees. New faculty are bringing in more advanced technology to their instruction to increase student engagement with more real-world situations that the students will encounter in their STEM careers. More online offerings have been created to increase access opportunities.

**Need for lab technician:** With increased numbers of students and faculty, the Physics program can no longer limp along without a dedicated lab technician as the Physics program has done for the past several years. Due to the lack of a dedicated lab technician, older equipment is falling into disrepair and newer equipment is prematurely aging because of no maintenance. Some concepts cannot be illustrated with currently available computer simulations—they require the tactile interface of hands-on interaction with real physical equipment. Furthermore, the coordination of multiple labs with multiple faculty now requires a dedicated lab technician to handle the increasing complexity of the logistics.

**Need for computer-based labs:** Students will spend more time analyzing and making sense of the data instead of data collection, since this is more typical of the conventional work environment in STEM. A technology request for laptops was submitted last year but was not granted. A new technology request will be submitted again this year.

**Need for off-campus Professional Development in Physics:** With three new faculty in the unit there is urgent need for financial resources to support yearly off-campus professional development activities that are specific to the physics discipline. This will be in line with program goal number 2: Improve professional development through training in areas specific to STEM and pedagogy. Such discipline-specific training could be acquired through faculty attendance at annual meetings of the American Physical Society (APS) and the American Association of Physics Teachers (AAPT).

**Need for 2 additional full-time physics faculty:**

Because of the immediate retirement of one physics instructor in Fall 2018 and the impending retirement of a second physics instructor at the end of this year, two more full time physics instructors is requested to be hired (or insure that adjuncts are available for the overage). The department chair has described concerns about not having enough faculty for the scheduled courses in Spring 2019 as a result of the retirement of one of the physics instructors. In order to maintain the physics offerings, most of which are service courses for other programs including engineering, nursing, and industrial automation, we need to have replacements.