

# Bakersfield College 2018-2019

## Program Review – Annual Update - Non Instructional

Program Name: Office of the Dean (Mathematics, Sciences)

Program Type (Administrative, Student Affairs, Academic Affairs, Other): Administrative

**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:**

As a unit of Instruction, the Office of the Dean of Mathematics and Sciences provides leadership in the development and evaluation of instructional programs, faculty, and curriculum to ensure integrity, equity and excellence of academics in mathematics and science related disciplines, which develop meaningful and lasting critical thinking skills in all Bakersfield College students.

### **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:** Evaluate and update pre-collegiate curriculum.

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?** 1: Student Learning

**Progress on goal achievement:** Ongoing

- Increased the number of MATH B65 sections.
- Used multiple measures to place more students directly into MATH B22.
- Started process to overhaul and streamline math curriculum to meet AB 705 requirements

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

- In 2018-19, finalize changes needed to the math curriculum with the math department to be AB 705 compliant
- By Fall 2019, there is a **need to hire at least 6 new fulltime math faculty** to cover retirements and additional student need for co-requisite supported transfer-level courses. This is a requirement for AB 705 as well as the new CCCC FTES funding model.

- 2. Program Goal:** Implement and develop new programs

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?** 1: Student Learning

**Progress on goal achievement:** Completed

- Worked with the Biology department to develop a new Environmental Science AS-T program. Bakersfield College is one of only four California Community Colleges with this AS-T.
- Three new fulltime Biology faculty were hired to start Fall 2018, all of whom have graduate degrees related to Environmental Science.

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

- Course develop detailed work needs to be completed in Spring 2019.
- Grants need to be obtained to start supporting student and faculty activities related to this program.
- Specific transfer agreements need to be established, especially to UC Santa Barbara and UCLA during 2018-19.

**3. Program Goal:** Expand online instruction.

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?** 1: Student Learning

**Progress on goal achievement:** Ongoing

- Increased the number of online MATH B22 sections.
- Added new online courses of GEOL B10 lecture, ASTR B1, and ASTR B2 during Fall 2017-Summer 2018.

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

- In 2018-19, add online lab-based courses GEOL B10L and PHYS B2A.

**4. Program Goal:** Support departments to expand academic engagement initiatives like thematic learning communities.

**List the institutional goals from the Bakersfield College Strategic Plan that will be advanced upon completion of this goal?** 1: Student Learning

**Progress on goal achievement:** Ongoing

- Started Umoja – ASTEP learning community courses in Math to improve African-American math success rates.
- Started a new LRNC MATH B540 course in Spring 2018 that merged two semesters of pre-calculus into one semester.

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

- In 2018-19, more support for contextualized courses in math based on Equity or Meta-majors is needed. This may include creating a budget for invited speakers appropriate to add contextualized depth to science and math courses.
- By Spring of 2019, apply for a grant to add personalized context to the Calculus sequence to improve student learning.

B. List new or revised goals (if applicable)

**Program Goal:** Increase degree and certificate completion

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

2. Student Progression and Completion

**Progress on goal achievement:**

Total degree completions in sciences and mathematics has increased by 201% from 2014-15 (69) to 2017-18 (208).

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

Graduations will increase with increased student success in pre-calculus and calculus courses.

- Apply for a grant in Spring 2019 to improve student success in calculus.
- Develop a co-requisite option for MATH B1A Pre-calculus I to start Fall 2019

Graduations will increase with more transfer agreements.

- Develop new UC transfer agreements for students completing Math and Science AS-T degrees.

Graduations will increase with more credential options.

- Work with faculty to develop at least one science certificate during 2018-19 academic year.

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

1. How does your trend data (or other data your area collects) impact your decision making process for your program?

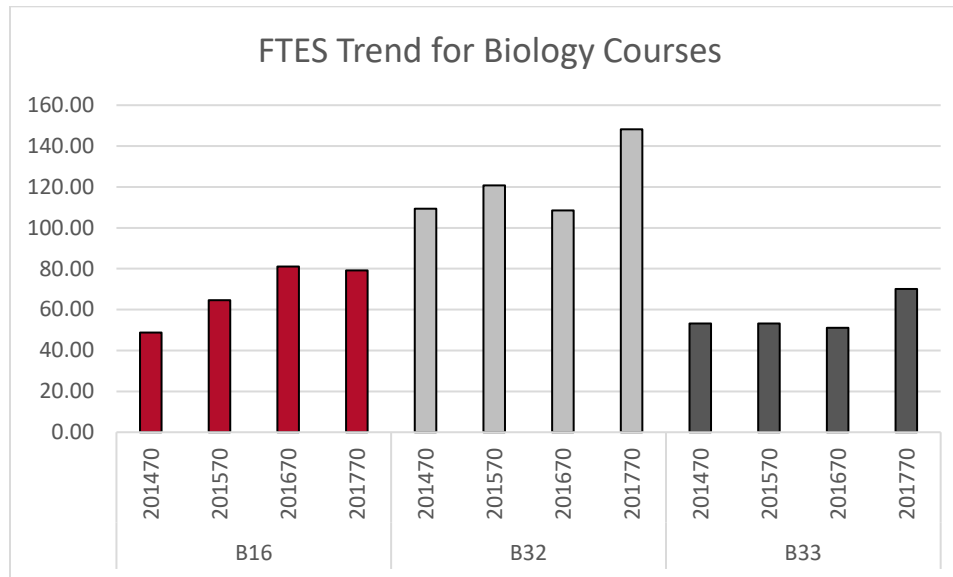
**Degree Completion**

From the 2014-15 academic year to the 2017-18 academic year, degree completion rates have increased 201% in math and sciences. See table below for details by program. This increase was driven by two factors.

- The introduction of AS-T degrees. This can be seen in the table below.

Program	Degree	2014-15	2015-16	2016-17	2017-18
Biology	AS	16	17	21	17
Biology	AS-T			1	9
Biology, Human Emphasis	AS	39	53	62	128
Chemistry	AS	3	4	5	2
Chemistry	AS-T			1	1
Geology	AS-T			2	0
Mathematics	AA	6	6	2	4
Mathematics	AS-T	3	11	11	27
Physics	AS	2	5	3	1
Physics	AS-T		6	12	19
<b>Total Science &amp; Math</b>		<b>69</b>	<b>102</b>	<b>120</b>	<b>208</b>

- The expansion of seats and sections available to students in the three critical biology courses needed for the Biology, Human Emphasis degree. This was accomplished with increasing the number of adjunct faculty from 1 to 5 over this time period. This upward trend in FTES generated for BIOL B16 (Microbiology), BIOL B32 (Anatomy & Physiology I), and BIOL B33 (Anatomy & Physiology II) can be seen for the Fall semesters from 2014 to 2017.



Note: Interestingly, the FTES for Physics courses needed for the Physics AS-T have not increased significantly over the same time period, yet the number of degrees awarded has dramatically increased, which was clearly driven by the start of the Physic AS-T degree. The same influence of the AS-T degree can also explain the increase in Math degrees awarded.

2. Evidence of Program 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.

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

The student demographics have not changed significantly.

**For Biology:** Females were 68% of the students compared to the College 53%. African Americans deviated from the College with 2% in biology classes versus 5% in the College. This tends to be driven by students completing the Nursing program pre-requisite courses.

**For Chemistry:** Females were 59% of the students, and African Americans were 3%.

**For Geology and Math:** The demographics followed those of the College, because these areas have most enrollments in general education courses.

**For Physics:** Course enrollments are skewed towards males at 69%, which is mostly driven by the Engineering program demographics. Again, African American students are lagging the College with only 3% in physics courses.

**Overall:** There is a need to address the socio-cultural career decisions that are made by students. It would be of value to see students equally interested in all of these areas of study. The absence of Africa American students from mathematics and sciences is an Equity concern.

4. 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](#).

African American students have lower success rates than other ethnicities in all areas of mathematics and sciences. This is worst in mathematics, with only a 41% success rate for African American students. Because of this as the Dean over this area, I am promoting the creation of culturally contextualized mathematics courses through the College's Umoja program. For future business leaders, teachers, and scientists, we need to improve African American success in mathematics, so I have recently received a grant to start working with South High to address Equity issues in preparing high school students for college mathematics before they start college. There is no more time available for us to wait and expect Bakersfield College remedial mathematics courses to pull up those students who were allowed to fall behind in high school. In Fall 2019, AB 705 will eliminate remediation from algebra all the way down to arithmetic. Remediation will need to be in the high schools, where students should learn this content and then retain it to be successful in the post-AB 705 world.

5. Please describe any recent achievements of members of your area who have won awards or distinctions, new projects your area has implemented, professional development work, professional conference presentations or recently published work.
6. 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.

The STEM Completion Coaching Team had the following accomplishments in the 2017-18 academic year.

#### **Clarifying the STEM Pathways**

- Created curriculum guides in conjunction with WARBA and the Pathways Institutes.
- Added job opportunities to the STEM brochure.
- Held a Pharm.D. Pharmacy Transfer event on Dec. 1, 2017.

#### **Getting students on the STEM Pathways**

- Created a video on what it means to be a STEM major.
- Held a STEM Pre-Health Conference event on March 2, 2018.
- Faculty were involved in Summer Bridge.
- Integrated with KHSD and CSUB through the Kern California Academic Partnership Program (CAPP).
- Conducted pre-collegiate school outreach at multiple elementary and high schools via MESA, Project Lead the Way and individual faculty efforts.
- Discussed at STEM meetings new multiple measures placement and AB 705 implications on accelerating new students into higher levels of mathematics.

#### **Keeping students on the STEM Pathways**

- Piloted Starfish with two STEM faculty.
- Held fun STEM student information events for National Chemistry Week and Pi Day.
- Applied for a new NSF S-STEM scholarship grant to encourage completion and transfer.
- Identified students at or near degree completion in Spring 2018 to provide graduation directions.
- Created communications for faculty to use in class and via email to explain to students how to be success and persist in their education.
- Established and reinvigorated Foundation scholarship funds.
- Used OIE data to identify students in Fall 2017 who were not attempting at least 15 units and contacted these students.

#### **Ensure Learning**

- Clubs recruited new students at STEM events, and these STEM clubs can be a resource for helping students learn.
- Math faculty encouraged students to attend the “Extend the Classroom” support services in the Math Hub.
- New grants included a request for funding for Peer Assistants and fulltime TA’s dedicated to helping STEM students.

7. Explain your role if you are involved in Dual Enrollment, Inmate Education, or Rural Initiatives.
- New faculty were hired over 2017-18 to start teaching mathematics and sciences in the Inmate Education program.
  - Math supported dual enrollment at Wonderful Academy in Spring 2018. This was only accomplished with providing a College faculty member to teach the MATH B22 section. Other high schools have not provided qualified teachers for math dual enrollment.
  - Biology continued to have two dual enrollment high school teachers, but communications need to be strengthened for this to progress.
  - Physics has one high school faculty member teaching dual enrollment.
  - Chemistry was taught as dual enrollment at Wonderful Academy.
  - Math courses have been continuously growing at Delano, BC Southwest and across the rural areas. At Delano and BC Southwest, students may complete up to MATH B6A Calculus I.
  - The lack of facilities for science labs beyond the Panorama and Delano campuses limits expansion of sciences into these areas. However, PHYS B2A was taught at Delano for the first time in Fall 2017. Additionally, more sections of chemistry were added at Delano.

#### **Assessment Report - Annual Update**

- A. List your Administrative Unit Outcomes (AUOs)
1. Use data to improve student learning opportunities through scheduling.
  2. Increase positive program and success communication between faculty and students.
  3. Manage faculty evaluations to encourage teaching towards student thinking.
  4. Promote student persistence to completion.
  5. Use budgeting processes and grant writing to obtain funds needed to impact student success.
  6. Increase transfer opportunities for students.
- B. How did your outcomes results inform your program planning?
- AUO 1. Course needs were determined quantitatively. This catalyzed the hiring of more faculty, especially adjunct faculty and scheduling of more sections in rural areas, online, and in the inmate program.
- AUO 2. Faculty participated in multiple student events to promote interest in STEM and provide more direction to students.
- AUO 3. Conversations during evaluations changed the language from “rigor” and “content” to “thinking” and “interaction”. This also led to a presentation on “Being Student Centered” at the math and science all faculty meeting in August 2018.
- AUO 4. This has promoted faculty to recognize students who have struggled to succeed, not only those who get the best grades. Faculty have contributed to writing an NSF S-STEM grant proposal to try to get funding specifically for persistence scholarships for STEM students.
- AUO 5. Not all funding can come from the general funds. The area has used non-categorical funding from throughout the College to purchase equipment and have events that are needed for student learning and success. Additional funds are being organized through the Foundation and grants for 2018-19.

AUO 6. As Dean, I worked as part of WARBA to detail transfer guidelines (Finish in 4) with CSUB. Additional agreements are being planned with UCLA for an agreement date in Spring 2019.

C. How do the Administrative Unit Outcomes align with Institutional Learning Outcomes?

AUO 1. Think critically and evaluate sources and information for validity and usefulness.

AUO 2. Communicate effectively in both written and oral forms.

AUO 3. Think critically and evaluate sources and information for validity and usefulness.

AUO 4. Demonstrate competency in a field of knowledge or with job-related skills.

AUO 5. Engage productively in all levels of society – interpersonal, community, the state and nation, and the world.

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### **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

3: Software – Improved access to Cognos for the Dean has allowed the faculty chairs to have more data to make decisions in a “just-in-time” fashion.

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.*

- New equipment was purchased for physics and chemistry labs at Delano. This is allowing the expansion of these courses at Delano.
- The Biology department used Foundation Innovation funds to purchase new microscopes for Anatomy & Physiology, and this has allowed students to look at cellular level of systems in the lab.

##### **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.

Mathematics and science classes continue to be waitlisted, following a very long trend. The major factors that are limiting access to mathematics and science courses are the lack of faculty (both fulltime and adjunct) and the limitations of space, especially science labs.

Over the past 4 years, at least 26 new fulltime faculty have been hired in these areas, and this has had major impacts to how Physics can support the Industrial Technology B.S. program at the College. Chemistry and Geology have doubled the number of fulltime faculty over these 4 years, and this is allowing the College to serve more students. However, fulltime hiring in Biology and Mathematics has just kept pace with separations and retirements. While the number of adjunct Biology faculty has increased, the net number of adjunct Math faculty has barely moved up as adjuncts find fulltime positions. The Math department hired its first 100% online adjunct faculty member in Spring 2018 to help expand beyond the math degree deficiencies of the Bakersfield area. The need for more Math and Biology faculty is clear with the implementation of AB 705, the new FTES funding model related to math success, and the ever increasing interest in health professions for incoming students.

At this moment, it may be possible to double the number of all math and science sections on the Panorama campus, and these will still have waitlists. However, sections at Delano and BC Southwest have been slow to enroll. Some sections of math at BC Southwest were cancelled last year due to low enrollment, and sections of science classes at Delano were run with less than 10 students just to keep total site enrollment higher. Thus, the construction of the new SE building on the Panorama campus is critical. Expansion of sciences with a new lab at Arvin in the near future will also make a positive impact on the space limitations. Expansion of sciences with labs online has begun, and this will also allow the College to start providing more students with the critical courses they need that currently limit their ability to complete their degrees.

The math and science area has a focus on improving student success through teaching how to think, communicating success with students, and finding ways to fund the area beyond the general budget of the College. This has increased enrollments and graduations in the area.

