

Bakersfield College

Comprehensive Program Review

Program Information:

Program Name: **Mathematics**

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 Math Department provides effective learning and earning pathways by understanding and responding to the many needs of our students who come to us with diverse economic, cultural, and educational backgrounds. The department addresses these students' needs by offering courses using various instructional modalities such as face-to-face instruction, as well as hybrid, online, compressed and accelerated classes. These math courses satisfy the general education requirement for students seeking a Certificate, or an Associate Degree. We also have transfer level courses required for those students wishing to transfer to a four-year university. Students majoring in Math, Science and Engineering may also complete an Associate Degree in Mathematics. The ALEKs-based program used in our Math Learning Center supports self-paced student learning through appropriate technology and provides a streamline system that improves student access, retention and success for those seeking a hybrid learning environment in Pre-Algebra, Elementary Algebra, and Intermediate Algebra courses.

Program Mission Statement:

In order to meet the needs of our students, our primary mission is to offer academic and vocational education in lower division mathematics, and to provide education and training that contributes to continuous work force improvement. Our secondary mission is to provide developmental instruction in Pre-Algebra, Elementary Algebra, and Intermediate Algebra, as well as support students with drop-in tutoring in the Math Learning Center.

The Bakersfield College Mathematics Department is committed to developing student numeracy skills, and to expand students' capacity to think critically and solve problems. We want our students to become productive members of society and the world. Hopefully along the way, they will learn to appreciate the beauty of mathematics, and also be able to communicate in the language of mathematics.

Instructional Programs only:

A. List the degrees and Certificates of Achievement the program offers : **A.S. Mathematics**

- 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. **A.A. Mathematics degree is currently being phased out.**
- C. If your program offers a local degree in addition to the ADT degree, please explain the rationale for offering both.

Progress on Program Goals, Future Goals, and Action Plans:

- 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 goals, please duplicate this section.

Current Program Goals	Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)	Progress on goal achievement (choose one)	Comments
1. Develop electronic course portfolios	<input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input type="checkbox"/> 4: Oversight and Accountability <input checked="" type="checkbox"/> 5: Leadership and Engagement	<input type="checkbox"/> Completed: _____ (Date) <input type="checkbox"/> Revised: _____ (Date) <input checked="" type="checkbox"/> Ongoing: Sept. 2017 (Date)	We have a drop box now in place for Math B65 instructors to use. This seems to be working better than the SharePoint website we tried which involved too much maintenance.
2. Look for solutions to the remediation problem, and to also streamline the math pathways for students.	<input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input type="checkbox"/> 4: Oversight and Accountability <input type="checkbox"/> 5: Leadership and Engagement	<input type="checkbox"/> Completed: _____ (Date) <input type="checkbox"/> Revised: _____ (Date) <input checked="" type="checkbox"/> Ongoing: Sept. 2017 (Date)	<p>Spring 2016 we started with 2 sections of Math B65 which is an accelerated math course to get students to statistics. For Spring 2018 we will be offering 13 sections of the course. Success rates are better than our Math B60, but we are finding that students are not taking either Math B22 or Psych B5.</p> <p>Funding is needed for workshops on teaching Math B65 which has a lab component, as well as funds for developing new labs and other course materials.</p>

			The redesign of the Math Lab courses is still ongoing. We have implemented more intrusive interventions to ensure students progress. The coordinator, Jon Brown, is also piloting some other kinds of hybrid courses that are different than the ALEKs based courses we currently have.
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B. List the program’s goals for the next three years. Ensure that stated goals are specific and measurable. State how each program goal supports the College’s strategic goals. Each program must include an action plan.

Future Goals	Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)	Action Plan	Timeline for Completion	Lead person for this goal
<p>1. Proper placement of students into the right math class.</p> <p>Justification: One of the biggest issues for student completion is ensuring students take the right math class for their major, and are enrolled in a teaching modality that works best for them.</p>	<input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input type="checkbox"/> 4: Oversight and Accountability <input type="checkbox"/> 5: Leadership and Engagement	<p>(1) Have math faculty participate in more Guided Pathway Activities.</p> <p>(2) Get information to math instructors about their students’ majors so they can give them an early warning that they may be in the wrong class for their major.</p> <p>(3) Find ways to educated students about online, hybrid and compressed courses so they can find the best fit for their learning style.</p>	<p>(1) ongoing</p> <p>(2) Spring 2018</p> <p>(3) ongoing</p>	Kathleen Rush
<p>2. Provide calculus and pre-calculus students with peer tutoring.</p> <p>Justification: In the past we had STEM Assistants paid</p>	<input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input type="checkbox"/> 4: Oversight and Accountability <input type="checkbox"/> 5: Leadership and Engagement	<p>(1) Find a stable funding source to provide the kind of peer tutoring that our former STEM Assistants did. We have many tutoring opportunities for remedial math students, but not as much for our</p>	<p>(1) Fall 2018</p>	Ararat Andrasian

<p>through the STEM grant that provided calculus and pre-calculus students with peer tutors. These peer tutors had already taken the same course and were successful in the course. We no longer have STEM funding.</p>		<p>STEM students taking calculus and pre-calculus.</p>		
<p>3. Provide events that will build strong relationships between math educators from a variety of institutions.</p> <p>Justification: We all have the same goal of student success. These events will give us the opportunity to share ideas, experiences, and best practices.</p>	<p><input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input type="checkbox"/> 4: Oversight and Accountability <input checked="" type="checkbox"/> 5: Leadership and Engagement</p>	<p>(1) Plan a Math Articulation Day for Spring 2018 hosted by the BC Math Department. (2) Find funding for this event as well as for any other workshops we may want to do.</p>	<p>(1) Planning to be done by end of Fall 2017. (2) Finding funding will be an ongoing process.</p>	<p>Joshua Lewis</p>

Best Practices:

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.

BP 1

Every semester I have all the students in all my classes write up an autobiography. Although I give them a handout with a series of specific questions to answer, that is merely meant as a guide. The students can structure their autobiography in any way they choose. Overall, reading the autobios helps me to somewhat tailor my teaching style to each class. Early in the semester I already am aware of potential rough spots in students’ understanding of math. It makes it easier to teach the sooner I know of such things.

Professor Bernard T. Scanlon

BP 2

I am going to describe a new practice that I have initiated that (a) allows me to question a student or students in more depth, and (b) inspires the students to work the practice problems that I have assigned (I hope). In all of my syllabi, I give them a list of practice problems to cover and review the material in each section of the book (B60, B70, B4A). The class following the day that we cover a section(s), I choose 3-5 of the practice problems (that the students should have worked) and I randomly assign students to work them at the board during the first half hour of class, and they come up in the order that I have preselected them. So, this is how we review the previous material--when they work a problem, I probe their thinking by asking questions about the problem they are working and any other related topics. In this manner, I gain access to the how the individual working the problem is thinking, as well as the rest of the class because they know I may ask them a question as well.

To date, it seems to be very effective. The students are great, they all understand that they may be asked to come up during any class (some have learned the sad fate of random selection when they were called up on consecutive days), and they are very forthcoming with answers to my questions. The process has become a socio-mathematical norm in all of my classrooms.

Professor Michael Fredenberg

BP 3

I use the SNIP function that is built into Microsoft Windows. This function allows me to cut and paste information from electronic textbook pages, PDF files, or any electronic files, to make my exams, quizzes, and handouts. It has really saved me lots of time from typing complicated problems, and hand cut and tape graphs to my exams.

Professor Li Kang Liu

BP 4

I believe that almost every class session should end with a “formative assessment” where they have about 8 problems to work in groups, submit to be checked, and immediately correct if necessary. Since these problems are to be worked in groups, the “quick quiz” is a very small portion of the overall grade, but it ends the period with the students actively working and discussing problems.

Carleen Watts

BP 5

Many students have a “mind-set” that math is impossible for them because of past failures in a mathematics classroom. They don’t see that a big predictor of their success is their attitude and their willingness to invest effort into learning the material. I have developed several writing assignments, where the student reads a short article and then answers a few questions regarding the article, with the last question being, “how do you think this information will help you succeed in college”. The topics of the articles are how to study math, how to develop a growth mind-set, “grit” why effort is just as important as intelligence, and hot careers and the math needed to follow that career path. I also allow them to find an article that is mathematical and have them write a few questions to go with their article. This has helped me find new articles to be used in future semesters. Professor Donna Starr

3 Year Program Analysis:

Take a look at your trend data. Provide an analysis of program data throughout the last three years (all programs should have some form of data that is used to look at changes over time) and report:

1. Changes in student demographics (gender, age and ethnicity).
 - Gender demographics remained relatively unchanged over the last three years. Female students make up 56% of our student population, which is a drop of only 2% over the last three years. Male students make up 43% and 1% of students declined to report gender. Our numbers are within 1-2% of the college-wide numbers.
 - The number of students in the 40 & older category dropped from 391 students three years ago, to 276 students this year, which is about a 29% decrease.
 - Our Hispanic student population increased 3% to 70% over the last three years. White students decreased from 21% to 19%. Our ethnicity makeup is consistent with the college-wide population.
2. Changes in enrollment (headcount, sections, course enrollment, and productivity).
 - Our enrollment went down for traditional students and increased for distance education students. The number of sections offered to traditional students only went down by 5 (224 to 219 sections) whereas the number of sections offered to distance education students went up by 20 (38 to 58 sections).
 - Our FTES increased from 1616.8 to 1642.7 due to an increase in distance education courses offered. Our FTEF also increased due to more distance education offerings, rising from 74.4 to 77.1.
 - Our productivity slightly dipped from 21.7 to 21.3 over the last three years, which is still significantly higher than the college-wide average of 17.4.
3. Changes in achievement gap and disproportionate impact.
 - We only have data for two years. Our African American student population saw a slight increase in success from 39% to 40% and a slight increase in retention from 75% to 77%. We still have a lot of work to do to help this student population.
4. Success and retention for face-to-face as well as online/distance courses.
 - For traditional courses, success increased from 56% to 58%, while the success for distance education dropped from 45% to 37%. Our retention went up for traditional courses (84% to 87%), while distance education dropped (78% to 76%) over the last three years.
5. Any unplanned events that affected your program.
 - none
6. Degrees and certificates awarded (three-year trend data for each degree and/or certificate awarded).
 - Three years ago we awarded nine degrees and we have met or exceeded that number each year.
7. Reflect on any changes you would like to see in your program in the next 3 years.
 - In an effort to help non-STEM/non-business students complete their math requirement for transfer faster, MATH 65 was created to shorten the pathway through developmental math. MATH 65 replaces MATH 60 and MATH 70 (prerequisite to statistics) for those students needing to take Statistics to transfer. Unfortunately, the data shows that more than 50% of our passing MATH 65 students are not taking statistics (MATH 22 or PSYCH B5) the following semester, defeating the purpose of shortening the pathway and acceleration. We suspect this is due to the pathway having a bottleneck. The college is not able to offer enough statistics courses to meet the student demand. The waitlists are full and many students are turned away. We would like to hire additional faculty so that we can offer more statistics courses.

8. List degrees and certificates awarded (three-year trend data for each degree and certificate awarded). Include targets (goal numbers) for the next three years.

Full Name of Degree or Certificate	2015- 2016	2016- 2017	2017- 2018	2018- 2019	2019- 2020	2020- 2021
AA-Mathematics	6	6	2	1	0	0
AS-T-Mathematics	3	11	11	12	13	14

Resource Request and Analysis:

Resource Request		If Fulfilled, Discuss How Previous Year's Requests Impact Program Effectiveness?
<p>Positions: <i>Discuss the impact new and/or replacement faculty and/or staff had on your program's effectiveness.</i></p>	<input checked="" type="checkbox"/> 1: Classified Staff <input checked="" type="checkbox"/> 2: Faculty	<p>Classified Staff: One of our Teachers Aide retired in the Math Learning Center (MLC) and was replaced. Also, we were able to hire a replacement for a Teaching Assistant who worked 30 hr. 11 months and left for a full-time job with benefits. These two replacement hires helped us more effectively implement our MLC redesign. But, because of more intrusive interventions to monitor student progress, we still need an additional full-time Teaching Assistant. (see Classified Position Request)</p> <p>Faculty: Last spring/summer we hired 3 new tenure track math faculty, and the year before that we hired 2 new tenure track math faculty. This has helped us maintain the number of math sections, but our faculty numbers are still not up to former levels. Quite a few of these new hires are former adjuncts, so our gains are minimum. We have requested 2 replacement positions due to retiring faculty, and one new full-time position to keep pace with growth and the Pathway commitment that all new students complete math in their first year. We need to get ahead of the curve on hiring since we have at least 5 faculty who plan on retiring in the next 5 years. (See Faculty Request)</p>

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

The focus of many of these professional development activities was on finding shorter pathways for developmental students, the use of technology in the classroom to enhance instruction, newly published textbooks, and new online platforms for teaching math – all of which contributes to student success.

Math faculty attended the following conferences over the past three years:

- Mathematical Association of America
- California Mathematics Council of Community Colleges
- California Acceleration Program Institute
- Acceleration and Developmental Education
- Institutional Design and Innovation
- National Council of Teachers of Mathematics

Other professional development activities that math faculty participated in includes:

- Math Articulation Day: Bakersfield College hosted this event, which featured workshops presented by BC faculty. This event allowed math teachers of all levels from all over Kern County to network and share ideas.
- Basic Skills Summit
- Winter Pathways Institute
- StatPrep Workshop
- New Textbook Workshop
- STEM Completion Coaching Workshop
- Teachers Summit at CSUB
- “Power of Math Humor” and “Back to School Puzzles” Workshop
- Solar Regatta

<p>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.</p>	<input type="checkbox"/> 1: Space Allocation <input checked="" type="checkbox"/> 2: Renovation <input checked="" type="checkbox"/> 3: Furniture <input type="checkbox"/> 4: Other <input type="checkbox"/> 5: Beyond Routine Maintenance	<p>Renovations: Because of the shortage of classroom space for math, LA 116 was renovated from a computer lab, which had old computers that were not being used, into a regular classroom. Long awkwardly arranged tables were replaced with 30 new student desks and chairs in addition to a new instructor desk and computer station. The room was painted, and the carpet replaced.</p> <p>Students are more comfortable and can see the front board more easily than they could in the old configuration. It is easier for the instructor to use more group activities, and circulate about the classroom during quizzes and exams. Students can more easily engage in their learning now.</p>
<p>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?</p>	<input checked="" type="checkbox"/> 1: Replacement Technology <input checked="" type="checkbox"/> 2: New Technology <input checked="" type="checkbox"/> 3: Software <input type="checkbox"/> 4: Other _____	<p>New Technology: Title V funds were used to update/put in new technology in two of our math classrooms, LA 116 and MS 103 such as Brightlink projectors and document cameras. The Math Department is committed to the effective use of technology to improve student learning. We feel technology gives us the opportunity to enhance student learning, increase student engagement, and also allows for more productive instruction. It also gives students more access to course materials.</p> <p>Software: Software licenses have been an ongoing issue with licenses expiring. We regularly use SmartNotebook, TI-SmartView, Maple and MatLab. We need to be sure that the number of licenses we need are maintained. All of these software programs create a more interactive, interesting, and exciting learning environment for our math students.</p>
<p>Resource Request</p>		<p>Discuss How Effective Request is for Student Success?</p>
<p>Other Equipment: If your program received equipment that is not considered audio/visual or computer equipment technology, please explain how these resources</p>	<input type="checkbox"/> 1: Replacement <input type="checkbox"/> 2: New <input type="checkbox"/> 3: Other _____	

<p><i>impact your program and help contribute to student success.</i></p>		
<p>Budget: <i>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.)</i></p>		

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 Comprehensive Review.

The Math Department supports BC students in the classroom as well as outside of the classroom. The Math Learning Center staff offers drop-in tutoring for developmental math students. Math faculty members support several clubs on campus such as the Future Teacher Club, the Math Club, and the Women in Engineering and Science Club. Other faculty members devote time to and support student achievement in activities like the MAA Student Poster Project, AMATYC Student Mathematics League Competition, the Mathematics Research Experiences in Community Colleges Conference, and the local Bakersfield Math Council AP Calculus Competition. We have educated ourselves about Guided Pathways, and are increasing the number of sections for our new accelerated math course called Math B65 Intermediate Algebra for Statistics which is for non-STEM majors. Several of our math faculty support math education in our community by participating with junior high math teams and clubs. Some math faculty serve as tutors in the new Extended Classroom, and more faculty are using supplemental instruction in their classes than ever before. We have supported our two full-time professional math tutors by inviting them to visit at least 60 sections of math classes per semester to provide students with information about Extend the Classroom for Math (ECM). This semester, the ECM location was moved from the CSS Building to MS 113 which is just down the hall from many of our classrooms. We are optimistic that this new location will encourage more students to get the help they need to be successful in their math classes.

BC is a pilot for the Common Assessment Initiative (CAI). Kris Toler has worked for the past several years with the statewide Math Work Group to develop a new common assessment tool for math course placement. We had 3 math work group sessions take the 120 math competencies and tie

them to the SLOs in each of our courses, and then we developed a strategy for using the competencies to make placement recommendations. Instructors have given up valuable classroom time in order to allow whole sections of students to pilot and field test CAI test questions. We hope that this new assessment tool will help us better place students in a course in which they have the best chance of being successful in math. This will be an ongoing process as we collect data to determine any needed changes in the new assessment tool. Since student placement in the right math class is such a huge component to student completion and success, we have added this as a new 3 year department goal.

The Completion/Pathways Agenda was the driving force behind our developing a new accelerated course, Math B65 Intermediate Algebra for Statistics. This course serves to shorten the pathway for non-STEM students to a transfer level course. But, we are finding that students who successfully complete the Math B65 are not taking statistics in the next one or two semesters. Another issue is that we have some STEM students taking this course which is not appropriate for their major. We are still collecting data on Math B65 in order to find ways we can address some of these issues.

The department further supports student learning through the use of appropriate technology. We now have all designated math classrooms outfitted with up to date technology. We are currently working to make sure the software we use on a regular basis to enhance our teaching have licenses that are renewed in a timely fashion. Last year we were able to purchase a mobile cart of 30 laptops that instructors can use in any of our 12 classrooms. One instructor this fall, used the laptops on the first day of class to make sure his students had their online homework accounts up and running. Our statistics courses use the TI-83/84 graphing calculators as an integral part of learning about and exploring data. We now have a class set of TI-84 calculators that instructors can check out for use in the classroom. For example, several of our PreCalculus instructors check them out to do graphing exploration labs. We support the statistics and finite math students with a self-sustaining Calculator Rental Program which rents graphing calculators to the students on the main campus and at the Delano campus for the reasonable price of \$10 per semester to ensure that this technology is made available to statistics and finite students who might not be able to afford to purchase a \$100 calculator.

The members of our department are committed to professional growth and we have math representation on every key campus-wide committee. Last spring our department hosted a successful Math Articulation Day in which math educators from KHSD, CSUB, PC and CC attended. For the past two springs, the Math Department has turned in Outcome Assessment Reports for ALL of our 16 different courses where we gathered data for over 100 sections of math. We have participated in many school-wide initiatives such as Habits of Mind, Title V Grant, Guided Pathways, Extend the Classroom for Math, and the Multiple Measures and Common Assessment Initiatives. Our efforts show our commitment not only to BC students, but to BC as an institution.

Our biggest concern is that the Trend Data point to the fact that we are not offering enough sections of math to meet the demands of the students. The week before a semester starts, we find that the waitlist for almost every section of math is full. Students are turned away. This is true for our developmental courses as well as for our transfer level courses. Our priority classrooms are utilized to the point that we must seek out classrooms in other areas of campus. Just hiring replacement math faculty is not enough. For example, we were able to hire 3 new math faculty last spring/summer, but that had little or no impact on our waitlists. To support student success and completion, we need to hire more full-time math faculty and adjunct faculty, a full-time teaching assistant for the MLC, and we need more classroom space.

