

## 2018-19 Mathematics Comprehensive Program Review

### I.A. Program Purpose

Describe the purpose of the program and how it contributes to the mission of Skyline College.

#### Narrative

The math program is unique in that it will make or break the comprehensive college redesign as well as the completion agenda. AB705 mandates that all transfer bound students complete transfer level math within two semesters of beginning a math sequence. In addition, the Chancellor's office funding formula incentivizes this completion occurring within the first two semesters of enrollment. However, according to the office's own research, without significant support and intervention, a significant portion of students, a possible majority in fact, who take a transfer level course in the first semester will fail and need to retake it in the second. Either that, or they will need to take one course below transfer in the first semester and then progress to transfer level in the second.

Within the math program two distinct math pathways have been realized: Statistics and Liberal Arts Math (SLAM) which is mainly associated with the Meta Majors of Arts, Language, and Communication as well as Society and Education; and (Business, Science, Technology, Engineering, and Math (B-STEM) which mostly connects to the Meta Majors of Business, Entrepreneurship, and Management as well as Science, Technology, and Health.

If placed directly into a transfer level SLAM, students with a High School G.P.A. less than 2.3 have a 29% chance of success. If placed directly into transfer level B-STEM, students with a High School G.P.A. less than 2.6 and who didn't take High School Precalculus have a 28% chance of success. In contrast, students with a High School G.P.A less than 1.9 have a 42.6% chance of passing transfer level English.

As a consequence of all of this, all transfer bound students will need to take math in the first semester with significant resources allocated to improve their success and persistence within their selected math sequence

Separate from the redesign and the the completion agenda, the purpose of the math program is to help students improve their own critical thinking, as well as the communication of that thinking, and to foster a love of lifelong learning. This directly aligns with the ISLO's of Critical Thinking, Effective Communication, and Lifelong Wellness. This in turn pairs with the vision of students achieving intellectual, cultural, and personal fulfillment. In pursuing this purpose, the aim is to empower classroom communities to participate in democratic societies across the globe.

By the next CPR the math department aims to incorporate the missing ISLO's of Citizenship and Information Literacy through the use of the civic minded data sets that the students themselves locate or collect. This will be done in both the B-STEM and SLAM pathways. However, at this time the math department have decided to stick to just three PSLO's in order to focus limited resources.

**Evidentiary Documents**

[AB705 Chancellor Memo 1.pdf](#)  
[AB705 Chancellor Memo 2.pdf](#)  
[AB705 Chancellor Timeline.pdf](#)  
[AB705 RP Group Paper.pdf](#)  
[AB705 Senate Clarification.pdf](#)  
[AB705 Senate FAQ.pdf](#)  
[AB705 SMCCD.pdf](#)  
[MATH Placement Chart.pdf](#)  
[SKY META MAJORS.pdf](#)

**I.B. Program Student Learning Outcomes**

List the current program student learning outcomes (PSLOs).

**Narrative**

1. ANALYZE problems in mathematics in order to appropriately choose and correctly apply concepts and techniques.
2. COMMUNICATE solutions in mathematics by using the multiple representation of graphs, tables, symbols, and words.
3. PARTICIPATE in activities that reinforce the use of success strategies while solving problems in mathematics.
4. CREATE mathematical models or hypothesis tests for real-world datasets and evaluate their implications for society.

**Evidentiary Documents**

[SLO Survey.pdf](#)

**I.C. Profile: Program Review Team**

Comprehensive program review is intended to be a collaborative process which promotes dialogue and reflection. Please identify all individuals who contributed to or shaped the program review narrative. Include names and the title or role of each person.

**Narrative**

David Hasson -- Tenured Faculty and B-STEM Math Pathway Coordinator  
Denise Hum -- Tenured Faculty and SLAM Math Pathway Coordinator

## II.A. Program Effectiveness

Review data related to the program and assess the program's effectiveness at meeting its described purpose. Consider using college-wide data for comparison purposes.

Program data may

- Standard program review reports from PRIE including indicators of success, retention, and equity
- Program-specific data such as labor market data, surveys, and custom reports
- Program Student Learning Outcome (PSLO) reports from TracDat
- Prior CPR/APPs
- Feedback from the program's administrator, advisory committees, and/or other stakeholders
- Course outlines of record and offering history (instructional programs only)
- Professional development received
- Other relevant data
- Additional data may be requested from PRIE by completing the Research Request Form available at <http://www.skylinecollege.edu/prie/request.php>

Based on the data reviewed, describe the overall effectiveness of the program and any conclusions drawn from the data

### Narrative

From 2013 to 2017, the math department had an average of 4989 enrollments per year, with 60.9% course success and 80.4% course retention. Assuming 80% persistence, this means that there is a throughput of roughly 48% per level below transfer. Thus, if a student has to start three courses below transfer then their chance of completing a transfer level course is  $.60 \cdot .80 \cdot .60 \cdot .80 \cdot .60 \cdot .80 \cdot .60 = 6.6\%$ . Similarly, two courses below is 13.8% and one below is 28.8%.

However, more students can be expected to complete degrees or transfer based on a reduction in exponential attrition through higher placement via multiple measures such as High School Grade Point Average and Guided Self Placement. All that is necessary is for students who would normally be placed three levels below to have a course success greater than a threshold of 6.6%. For two levels below the threshold would be 13.8% and it would be 28.8% for one level below. This should be already happening, as from Fall 2013 to Fall 2017, the percent enrolled below transfer dropped from 51% to 15% and the transfer level enrollment increased from 16% to 50%.

What is concerning is that from Fall 2013 to Fall 2016 the chance of a student enrolled in basic skills math completing transfer level math went from 22% to 16%. This may be due to relegating highest need students to basic skills math via multiple measures without providing the interventions and support they need to succeed while placing students with moderate needs into transfer level where resources have been focused in order to meet the college's completion agenda.

### Evidentiary Documents

[CPR-SKY\\_SCORECARD.pdf](#)

[CPR\\_ENG\\_DATA.pdf](#)

[CPR\\_MATH\\_DATA.pdf](#)

### II.A.1 **Progress on Prior Program Objectives (Goals)**

Describe the progress made on prior CPR/APP objectives including identification of achievements or areas in which further effort is needed. If the program is new with no prior CPR/APP, comment on new program implementation.

Below the narrative box, use the Associate Objectives feature to select the related objectives. Once associated, you may also view each objective. If appropriate, edit the status to Completed or Discontinued.

#### **Narrative**

Three prior objectives were to improve both intra- and inter-departmental communication as well as a revision of student learning outcomes. As for communication, two communities of practice have been formed around the SLAM and B-STEM pathways with a department coordinator for each. Nested block scheduling will be implemented to ensure that these communities can regularly meet Fridays 11:30am to 1:00pm. The coordinators are regularly meeting with the Counseling and English departments; the Assessment, Learning, Disability Resource, and STEM centers; the College Redesign Team; the Student Equity and Support Program; and the Center for Transformative Teaching and Learning. In addition, the math department is planning on having four faculty liaisons for the the four Meta Majors with two participating in each community of practice.

As for the revision, the Program Learning Outcomes now focus on analysis, communication, and participation as do all Student Learning Outcomes, albeit in the context of their respective course content. An online pre/post survey was created and implemented to assess all of the above.

## II.A.2 Progress on Program Student Learning Outcomes

Describe the progress made on PSLOs including achievements, gaps in learning, and/or areas in which further effort is needed.

Upload the TracDat report to the SPOL document repository in the Program Review folder for the current academic year (Program Uploads). Make sure the file name includes the program name or abbreviation (e.g., PRIE-TracDat 2017).

### Narrative

Given the aforementioned revision and the transition thereto it is hard to gauge progress on the old Program Student Learning Outcomes. However, the next three year cycle should have no dissonance between the old paradigm and the new. There are now much better connections with course student learning outcomes; institutional learning outcomes; the mission, vision, and values of the college; meta-majors; and guided pathways. Specifically, the new paradigm allows for the gauging of growth as students move along integrated course sequences within the SLAM or B-STEM pathways. Thus, the math department expects a very clear picture of both progress and challenges. As a reminder, the three new program student learning outcomes are:

ANALYZE problems in mathematics in order to appropriately choose and correctly apply concepts and techniques.

COMMUNICATE solutions in mathematics by using the multiple representation of graphs, tables, symbols, and words.

PARTICIPATE in activities that reinforce the use of success strategies while solving problems in mathematics.

And a possible fourth is...

CREATE mathematical models or hypothesis tests for real-world datasets and evaluate their implications for society.

### Evidentiary Documents

[SLO Survey.pdf](#)

**II.A.3.a Program Personnel**

Describe the current staffing structure of the program and how it aligns with achieving the purpose of the program.

**Narrative**

The math department consists of thirteen full-time faculty, five of which are women and eight of which are men. There two African Americans, a Taiwanese immigrant, an Iranian Immigrant, a South Korean national, two of Japanese descent, and one of Chinese descent.

**II.A.3.b Personnel FTE**

Provide the current FTE of each category of personnel.

- FT Faculty FTE:
- Adjunct Faculty FTE:
- Classified Staff FTE:
- Administrator FTE:

**Narrative**

FT Faculty 11.5 FTE  
Adjunct Faculty 7.2 FTE  
Administrator 1.8 FTE

#### II.A.4 Program Access

Describe matters of access relevant to your program such as offering patterns, service hours, F2F vs. DE offerings, availability of services to online students, on-campus vs. off-campus locations, unaddressed needs, and/or highly effective practices.

##### **Narrative**

The math department has taken on numerous programs and processes to improve access via placement, preparation, in-class support, learning community offerings, and reducing cost.

With regards to placement, students are now given a default recommendation into transfer-level math with or without corequisite support. This is based on high school grade point average ranges put forth by the Chancellor's office on the implementation of AB705. By setting forth this process, not only should more students graduate or transfer, but all criteria of the state's funding formula should be met. As such, the maximum number of categorical funds should be available to support students in these transfer-level courses. Furthermore, students may validate their recommendation through guided self placement performed within the assessment center. Consisting of free exercises on the website Khan Academy, the GSP is a 30-45 minute in-depth exploration of the mathematics necessary to succeed in a prospective course.

Should students want to prepare further, the math department has implemented Math Jam during all intercessions as well as the Summer Scholars Institute. As opposed to 30-45 minutes, students will have one to two weeks to dive into the math necessary to succeed in their coming course, with tutors and group exploration to help them on their way.

Along those lines, Embedded Tutoring and Supplemental Instruction continue to be offered as in-class support, with the former primarily being used in classes with co-requisite support. So far corequisite support courses ranging from one to three units have been created for Math 120, 190, 200, 225, and 241. These extra units allow just-in-time remediation to occur through group exploration and in-class tutoring. Supplemental Instruction is still useful for courses without corequisite support, as it affords students the opportunity to meet outside class to work on study skills within the context of the class by following the example of a master student, in this case the Supplemental Instruction Leader.

To further encourage exploration of content occurring in groups, the math department continues to offer courses as part of Learning Communities. This builds on social networks being formed outside class as well as offers opportunities for meaningful contextualization of the curriculum. These learning communities include ASTEP, CIPHER, Engineering Tech Scholars, FYE, Kababayan, Promise Scholars, and PUENTE.

Finally, it is not enough to provide support as barriers also need to be removed. Towards this end, the math department has adopted or written low cost textbooks for Math 811, 110, 120, 130, 190, 200, and 201. It has also adopted a single choice when it comes to textbooks from traditional publishers such as Pearson, Cengage, or Wiley.

This ensures that students are more easily able to sell paper copies of their textbook or buy the copy used. In addition, the cost of these textbooks has been lowered through inclusive access, in which a student automatically purchases an electronic copy of the book and access to online homework via registering for the class. Often, the savings incurred are around 40% and, of course, students are given the option to opt out if they so choose. Also, costly graphing calculators are being replaced with laptop carts that provide access to free or low cost software such as Desmos, Minitab, or Statkey. Not only does this lower costs for students, but it allows for a more intuitive and thorough exploration of both abstract mathematics and real world data.

## II.A.5 Program Environment

Describe key factors and changes impacting the program such as college initiatives, industry needs, regulatory changes, state mandates, grant requirements, personnel changes, demand for classes/services, and other issues.

### **Narrative**

In addition to AB705, Guided Pathways, and Meta Majors, a major factor to consider is that not all of the college's feeder high schools require three years of math as some only require two. As a result, the variability in student's readiness is extreme. This will continue to be a challenge and will require significant dialogue between administrators, faculty, and counselors across all secondary and postsecondary institutions within the county.

## II.A.6 Program Equity

Based on the data reviewed, highlight any progress and/or effective practices employed in the program to address identified student equity gaps and minimize disproportionate impact. Describe any pre-existing or anticipate program barriers in making progress. If you intend to request resources for objectives related to equity, explain any connections between barriers described and the support/resource(s) requested.

### Narrative

The highest performing Ethnicity is Asians with 4406 enrollments at 71% success from 2013 to 2017. Black-Non Hispanic, Hispanic/Latino, and Pacific Islanders do not fall within 80% of this (56.8% success) and as such meet the technical definition of disproportionate impact.

Specifically, Black/Non-Hispanic had 659 enrollments at 47% success, Hispanic/Latino had 4,978 enrollments at 53% and Pacific Islander had 319 enrollments at 46%. Currently, there are SLAM and B-STEM pathways within the ASTEP learning community and two African American full-time faculty coordinating each. Ideally, this model would be replicated for the PUENTE learning community to address the needs of the Hispanic/Latino population as well as Kababayan learning community with recruitment of Pacific/Islander students to participate. All of this would require outreach and recruitment of new graduates from Master's programs at SFSU, SJSU, and CSU East Bay as well as elsewhere.

In addition, the SLAM and B-STEM communities of practice need to continue participating in professional development regarding culturally relevant curriculum and pedagogy. This could be done through participation in the Equity Training Series or some other collaboration with the Student Equity and Support Program. The implementation of any innovative practices as a result of this collaboration could be monitored within the communities of practice through yearly data reports provided by PRIE as well as focus groups and surveys. Of course, all of this would be disaggregated by gender, age, and ethnicity as well as other factors.

### Evidentiary Documents

[CPR\\_MATH\\_DATA.pdf](#)

### III.A. Curriculum Review

There are four steps to program review of curriculum:

1. Request your program's Course Offering Report from PRIE. Based on that report, take action to bank, delete, and/or reactivate courses. PLEASE SEE THE CPR WEBSITE (DIRECTIONS AND FORMS) FOR DETAILED INSTRUCTIONS.  
<http://www.skylinecollege.edu/programreview/cpr.php>
2. Review and update all course outlines on CurricUNET. PLEASE SEE THE CPR WEBSITE (DIRECTIONS AND FORMS) FOR DETAILED INSTRUCTIONS.  
<http://www.skylinecollege.edu/programreview/cpr.php>
3. Complete the Course Outline and Prerequisite Checklist Table. Upload the file to the SPOL document repository in the Program Review folder for the current academic year (Program Uploads).
4. Verify and document the two-year cycle of curriculum offering to ensure that students have access to courses necessary to complete certificates, degrees, and transfer in a timely manner. Review the sequencing of prerequisites.

#### Narrative

The new course outlines of record will be uploaded as a compiled .pdf just as soon as they are all approved by curriculum committee. The following still have yet to be approved at the corresponding dates:

- i. 03/20/2019 -- 120, 222, 241, 243, 251, 800, 820
- ii. 04/17/2019 -- 130, 252, 253, 270, 275, 650\*, 670\*,
- iii. 05/01/2019 -- 819, 811, 111, 112, 122, 123, 242

#### IV.A.1 **Considering Key Findings**

Considering the results of CPR assessment, identify program strengths, challenges, opportunities, concerns, and areas in which further research is needed. Describe how the key findings can be used to improve program effectiveness in order to promote student learning and achievement.

##### **Narrative**

The strength of the math department is its willingness to restructure itself to meet the needs of students and to do so incorporating best practices across the state. In response to the Basic Skills Initiative the math department implemented Supplemental Instruction for pre-transfer courses and contextualized teaching and learning through the Career Advancement Academies. The California Acceleration Project encouraged the forging a Path to Statistics through the creation of MATH 190. AB705 led to the realization of the SLAM and B-STEM math pathways along with corequisites for almost all of the transfer level courses as well as those courses remaining below transfer. Speaking of which, it also led to the elimination of MATH 811, MATH 190, and placement tests.

An additional strength has been the diversity of the department's full-time faculty as well as a mindfulness of equity. This includes the adoption of low-cost textbooks as well as the writing of those textbooks and the adoption of computer software in place of costly graphing calculators. It also includes participation in professional development regarding culturally relevant curriculum and pedagogy.

The challenge is that by placing students higher via multiple measures and guided self-placement there has been an increase in the college's success at the expense of course success. The college has and will continue to have higher completion and transfer rates while the number of students passing classes will most likely drop significantly. In the process, faculty cannot help but feel disenfranchised and disheartened.

However, there are opportunities to increase both college and course success through the commitment of specialized support for the SLAM and B-STEM pathways. Meta Major counselors could regularly attend community of practice meetings to help us integrate the best practices from COUN 100 as well as to serve as ambassadors with the counseling department. Instructional Aides from the Learning and STEM centers could work in concert with the counselors to specialize their training of embedded tutors and supplemental instruction leaders in order to meet the needs of the given pathway. Finally, retention specialists could be hired or reassigned to assist in case management and to help diagnose systemic pathway barriers through their direct experience with students.

This could be done through the lens of integrated course sequences in which cohorts take SLAM and B-STEM math contextualized for their respective Meta Major, all within the first semester. Curriculum threads of data modeling, dimensional analysis, financial literacy, and hypothesis testing could be introduced in these courses and then continued in subsequent courses through the use of e-Portfolios. Finally, this could culminate in capstone projects integrating all of the threads.

Of great concern is the significant funding necessary for all of this. However, the Chancellor's office has designated Student Equity and Achievement (SEA) Program funding as well as Guided Pathways funding for this work. In addition, as the math program is doing everything it can to meet the criteria of the funding formula, it makes sense that the math department would receive a significant portion of these funds.

Also, it is important that these funds be used wisely. Thus, it is essential that there is ongoing research to see which best practices of the math department have the greatest return on investment. This will require continued collaboration with PRIE on a yearly basis, if not a semester basis.

Finally, a place is needed for returning adults, non-high school graduates, and students with significant learning differences. The Educational Access Center being formed through the DRC could provide a space of twelve computers for students to work on Directed Learning Activities in math with a qualified instructional aide, all before beginning their math sequence and the two semester clock it entails. In this way, it could be ensured that these students wouldn't be relegated to adult school and that the historical mission of the community college system could continue to be met. These Directed Learning Activities could also be made available for the Learning Center, Math Jam, and on the math department website so that all may better prepare themselves for their coming courses.

### **Evidentiary Documents**

[EAC Proposal.docx](#)

#### **IV.A.2 Aspirations**

The key findings and program aspirations will be used as the foundation to build a strategy for program enhancement.

- What is the ideal future of the program?
- What long-term results does the program want to achieve?
- How do the key findings prompt or inform the program's aspirations?

#### **Narrative**

The ultimate aspiration of the math program is to heal the divide between the Liberal and Servile Arts that Aristotle made some 2366 years ago. It is to take the contextualized and integrated curriculum of private institutions designed for America's socio-economic elite and bring it to the local community at \$46/unit instead of \$40,000/semester. It is for all students to become the liberated executive leaders of their own lives, no matter what career they choose. This may be done by beginning each student's integrated course sequence with a math course that is contextualized for a chosen meta major, cross referenced with General Education themes, and culminates in a capstone project of either hypothesis testing or data modeling applied to real-world data with meaningful implications for the student, the class, and society at large.

**V.A. Program Strategy**

Based on the key findings and aspirations, develop a plan designed to enhance the quality of the program. Describe the strategy (or strategies) to be implemented over the next six years. Strategies could include intended changes or areas of inquiry to pursue.

[NOTE: In the next item, objectives will be created with action steps and resource requests to support each strategy identified here. Each objective will also be tied to an Institutional Goal.]

**Narrative**

Goal #1 -- Technological resources to support low-income students.

Plan -- Purchase sixty laptops, six laptop carts, thirty Minitab site licences, and join TAC in order to advocate for reliable and scalable WiFi within Buildings 1, 2, 4, 7, 8 and Pacific Heights.

Resources Needed -- \$90000 for the laptops, \$3000 for the carts, \$3000 for Minitab, and storage allocated in Buildings 1, 2, 4 and Pacific Heights

Date -- Fall 2019

Goal #2 -- SLAM Community of Practice Meetings.

Plan -- Schedule SLAM courses so as to allow the community of practice to meet 1st and 3rd Fridays 11:30am-1:00pm. Then invite the ALC and SE meta-major counselors, the TLC Math Instructional Aide, and the Peer Mentors Retention Specialist to attend. Finally, identify two meta-major math faculty liaisons within the community.

Resources Needed -- 0.2 FTE for the SLAM faculty coordinator as well as support from Deans and Vice Presidents to encourage inter-departmental participation.

Date -- Fall 2019

Goal #3 -- B-STEM Community of Practice Meetings.

Plan -- Schedule B-STEM courses so as to allow the community of practice to meet 2nd and 4th Fridays 11:30am-1:00pm. Then invite the BEM and STH meta-major counselors, the STEM Center Math Instructional Aide, and the STEM Center Retention Specialist to attend. Finally, identify two meta-major math faculty liaisons within the community.

Resources Needed -- 0.2 FTE for the B-STEM faculty coordinator as well as support from Deans and Vice Presidents to encourage inter-departmental participation.

Date -- Fall 2019

Goal #4 -- Hire two new full-time faculty.

Plan -- Advocate within the FTES Allocation Committee by providing the justification that the department is currently being staffed at 7.2 FTE by adjunct faculty each semester.

Resources Needed -- 2.0 FTE

Date -- Fall 2019

**V.B. Action Plan and Resources Requests**

Develop one or more measurable objectives (goals) to begin in the next year. Each objective will include action steps and any related resource requests. No narrative response will be entered in this section, but the objectives you create will be printed automatically in the CPR report under this item.

1. To begin, click on PLANNING at the top of the page, then CREATE A NEW OBJECTIVE. To view previously created objectives, click PLANNING at the top of the page, then VIEW MY OBJECTIVE.
2. IMPORTANT! Make sure to associate each objective to this standard in the CPR and link each objective to one or more Institutional Goals. Need help? Contact the PRIE Office for further instructions.

**Narrative****Associated Objectives**

[743-B-STEM Community of Practice Meetings.](#)

[744-Hire two new full-time faculty](#)

[742-SLAM Community of Practice Meetings.](#)

[741-Technological Resources for Low Income Students](#)