INSTRUCTION PROGRAM REVIEW: SPRING 2013 SUBMISSION CYCLE

Program Name: Mathematics Academic Year: 2012- 2013
Faculty Contact: Melvin Hom, homm@smccd.edu Program Review Submission Date: March 25, 2013

I. Description of Program

Provide a brief description of the program and how it supports the college's College Mission and Diversity Statements, Institutional Priorities, 2008-2013, 5 in 5 College Strategies, Spring 2011, and other institutional planning documents as appropriate.

The Mathematics Program is comprised of three types of courses: A. Non-transferable courses, including basic skills: Math 811, 802, 850, 110, 111, 112, 115, 120, 122, 123; B. Transferable courses for Liberal Arts and Business majors: Math 125, 145, 147, 200, 241, 242; C. Transferable courses for Science, Engineering, and Math Majors: Math 130, 222, 251, 252, 253, 268, 270, 275. Currently, Math 110, 120, 145 and 200 are offered in hybrid format and Math 120 and 200 are offered in on-line format in summer session.

The program offers two Associate degrees: AS in Mathematics and AA-T in Mathematics.

The department offers student support in the Math Resource Center which is staffed by faculty and student tutors (see Math Resource Center Program Review: Spring 2013 Submission Cycle)

II. Summary of Student and Program Data

A. *Student Learning Outcomes Assessment*

Summarize recent SLO assessments, identify trends, and discuss areas in need of improvement.

The department maintains a schedule of SLO assessment that has most courses on a 6 year cycle. If an area for improvement is identified then that area is assessed at least annually until the "problem" is resolved. Courses in the algebra sequence (110, 111, 112, 120, 122, 123) are assessed each year, because we are in year two of a focus on areas needing improvement in that sequence. Thus, during Fall 2011 we assessed SLOs in math 111,112,110, 122, 123, 120, and 125; during Spring 2012 we followed up on assessment in math 130, and during Fall 2012 we assessed SLOs in math 111,112,110, 122, 123, 120, 125 (follow-up), 145, 275, and 850.

Trends in Algebra Sequence (111,112,110,122,123,120). The current emphasis on "mastery" of a core of concepts and skills (started in 2010) shows positively in SLO assessment with the number of SLOs across those courses where the standard is met increasing dramatically in five of the six courses, including all three basic skills courses (111,112,110). The anomaly occurred in Math 122 which showed a decrease in SLOs where criteria was met in 2012. We will investigate this decrease in SLOs. Annual assessment will continue in these six courses. The department has requested data regarding success and persistence from PRIE that will include these six courses and on to transfer from Fall 2010 through Spring 2013.

Math 125 was identified as a "problem area" in 2010-11. Inconsistencies in content from instructor to instructor and thus lack of alignment with the course content and the Common Core Instrument was identified as a likely source of the "problem." A full-time faculty member developed a prototype schedule and pacing document which was and will continue to be communicated and followed up on with all current instructors. The results were dramatic. During the fall 2012 semester, Math 125 assessment met standards for every objective, and increased the class percentage success on each SLOs questions.

Overall Trends:

- In major courses, Math 251 and above, standards tend to be met for every objective at each assessment.
- In transfer level courses (non-major courses) a follow up assessment on one SLO (out of 6 to 10 SLOs per course) is not unusual. Faculty awareness of trouble spots and subsequent changes in pedagogy or time-on-task usually leads to a satisfactory assessment within one year.
- At below transfer level and basic skills a "problem area" is almost consistently identified and vary from semester to semester.

B. Student Success Indicators

1. Review Student Success and Core Program Indicators and discuss any differences in student success indicators across demographic variables. Also refer to the College Index and other relevant sections of the Educational Master Plan: Update, 2012, e.g., Student Outcomes and Student Outcomes: Transfer. Basic Skills programs should also refer to ARCC data.

The Mathematics Department has had a modest gain in student success the past three years, with a 56.9% success rate in 2009-2010, 57.3% success rate in 2010-2011, and 58.8% success rate in 2011-2012. Among African-Americans, there was an increase in success rate from 41.2% in 2010-2011 to 49.3% in 2011-2012. Despite this increase, the success rate among African-Americans is still much lower than other ethnic groups, and hopefully we can bridge the gap in future years. Females continue to have slightly higher success rates than males (61.5% for females and 56.2% for males during 2011-2012), but males continue to take more math classes than females (2753 males versus 2272 females during 2011-2012).

The percentage of new students assessed into basic skills mathematics has grown from 44% in 2009 to 52% in 2011. The unduplicated number of students enrolled in basic skills mathematics hovers near 1000 semester. Both student success rates (56.8% in 2011) and student retention rates (80.9% in 2011) for Basic Skills Mathematics (811, 802, 111, 112, 110) have risen approximately 6% from 2009 to 2011. We do note that while the overall CSM ARCC indicators are in line with or slightly higher than state wide indicators; however, mathematics is not a separated indicator.

2. Discuss any differences in student success indicators across modes of delivery (on-campus versus distance education). Refer to Delivery Mode Course Comparison.

For Math 200, the success rate in Distance mode was 59.3% vs. Traditional mode at 57.8%, essentially the same. However, for Math 120, the success rate in Distance mode was 37.4% vs. Traditional mode at 59.9%, and much lower. For Math 110, where the success rate in Distance mode was only 16.5% vs. Traditional mode at 56.5%. It is clear that, for many students, especially at the lower levels, a Distance mode does not work well, but for some students who can dedicate themselves to keeping up with the work apart from the classroom, the Distance mode is ideal for them.

C. Program Efficiency Indicators. Do we deliver programs efficiently given our resources?

Summarize trends in program efficiency as indicated in the Student Success and Core Program Indicators (LOAD, Full-time and Part-Time FTEF, etc.).

The LOAD has gone from 595.1 in 2009-2010 to 593.4 in 2010-2011 to 543.2 in 2011-2012, consistently higher than the college total. The Full-time FTEF has remained steady, from 23.5 in 2009-2010 to 23.1 to 2010-2011 to 24.9 in 2011-2012. Adjunct FTEF has also remained steady, from 23.5 in 2009-2010 to 25.1 to 2010-2011 to 24.3 in 2011-2012. The Percent of Full-time has remained at roughly 50%, from 50.7% in 2009-2010 to 48.9% in 2010-2011 to 51.7% in 2011-2012,

consistently lower than the college average. We are far away from the target of 75% full-time and 25% adjunct, and we need to hire more full-time faculty.

D. Course Outline Updates

Review the course outline update record**.** List the courses that will be updated in the next academic year. For each course that will be updated, provide a faculty contact and the planned submission month. See the Committee on Instruction website for course submission instructions. Contact your division's COI representatives if you have questions about submission deadlines. Career and Technical Education courses must be updated every two years.

Courses to be updated	Faculty contact	Submission month
Math 110	Ken Brown	Oct 2014
Math 111	Ken Brown	Oct 2014
Math 112	Ken Brown	Oct 2014
Math 122	Ken Brown	Oct 2014
Math 123	Ken Brown	Oct 2014
Math 850	Ken Brown	Oct 2014

E. Website Review

Review the program's website(s) annually and update as needed.

Faculty contact(s)	Date of next review/update
Robert Hasson	Fall 2014
Lena Feinman (MRC pages)	Fall 2014

F. Additional Career Technical Education Data – CTE programs only. (This information is required by California Ed. Code 78016.)

1. Review the program's Gainful Employment Disclosure Data, External Community, and other institutional research or labor market data as applicable. Explain how the program meets a documented labor market demand without unnecessary duplication of other training programs in the area. Summarize student outcomes in terms of degrees, certificates, and employment. Identify areas of accomplishment and areas of concern.

   N/A

2. Review and update the program's Advisory Committee information. Provide the date of most recent advisory committee meeting.

   N/A

III. Student Learning Outcomes Scheduling and Alignment

A. *Course SLO Assessment*

Explain any recent or projected modifications to the course SLO assessment process or schedule.

Scheduled for assessment in Fall 2013 are 111,112,110, 122, 123, 120, 270, 811, and 850 (follow-up as course is newly revived). For the algebra sequence, the department will continue with a focus on greater student mastery of identified skills and concepts and will continue yearly SLO analysis.

Math 850 was revived in Fall 2012, as enrollment in this unique hybrid, self-paced, individualized course is low, outcomes will be assessed each semester for at least another year.

The math 811 course outline has been updated and a new focus on Math 811 is launching in Fall 2013, so that course will be assessed annually for the next several years. A team has been identified who will design and administer a new common core instrument starting in Fall 2013.

B. Program SLO Assessment

Explain any recent or projected modifications to the program SLO assessment process or schedule.

Program SLO assessment was instituted via a pre-matriculation survey during 2012. The department initiated that process at that time. We do project any modifications in the process in the next year.

C. SLO Alignment

Discuss how Course SLOs support Program SLOs. Discuss how Course and/or Program SLOs support Institutional/GE SLOs. Refer to TracDat related Program and Institutional SLO reports.

All Mathematics course SLOs are aligned with institutional (general education) SLOs; all align with GE SLOs in Quantitative Skills, many align with GE SLOs in the areas of Effective Communication and Critical Thinking.

IV. Additional Factors

Discuss additional factors as applicable that impact the program, including changes in student populations, state-wide initiatives, transfer requirements, advisory committee recommendations, legal mandates, workforce development and employment opportunities, community needs. See Institutional Research as needed.

According to the Educational Master Plan, San Mateo County is projected to have an increase in demand for biological science, physical science, and computer science majors. Math is required in all of these fields.

V. Institutional Planning

A. Results of Plans and Actions

Describe results, including measurable outcomes, from plans and actions in recent program reviews.

Spring 2012 Submission Goal 1: Increase the number of full-rime faculty. Insufficient full-time faculty was identified as a weakness. We noted that there are not enough full-time faculty to spearhead efforts to improve success in the developmental mathematics sequence, to develop and assess ventures into the on-line/hybrid world of mathematics courses, and to share the heavy "administrative load" of SLO assessment and reporting, updating 25 course outlines, scheduling of courses and the MRC, communicating effectively with a pool of about 30 adjunct faculty members per semester, and active participation in essential division and campus committees. We also noted that our last new hire was accompanied by a retirement so we have had a full-time faculty net gain of 0 and that there are a few other full-timers who have indicated plans to retire in the near future. Our request for new hires was not successful and is thus carried forward as a 2013 request, for three new hires.

Spring 2012 Submission Goal 2: Increase the number of courses offered in online or hybrid format. During Fall 2012 Math 145 was successfully offered in hybrid for the first time. It is being taught in that format during Spring 2012 and will be offered as a hybrid in Summer 2012. We attempted to add hybrid versions of Math 111 and Math 122 to the Spring schedule, however, both were canceled due to single-digit enrollment.

Spring 2012 Goal 3: Evaluate different flexible scheduling options. The department successfully added a new TTH mid-afternoon section of Math 200 in Spring 2012 and plans to continue with this offering. After coordination with other departments within the division, some STEM math courses will be offered (starting in the fall 2013 semester) with new formats (and at new times to avoid conflicts with science courses that are often concurrent with the mathematics selection). For example, Math 253 will be offered MWF on a 2-2-1 schedule and a Math 130 will be converted to MW on a 2-2 schedule. Math 811 will change from a 3 contact hour format to a 5 contact hour format for Fall 2013 requiring major changes in the configuration of the department schedule and creative scheduling to meet the needs of students who can only be on campus MWF or TTH. For example, Math 811 will be offered on TTHF in a 1.5-1.5-2 configuration and on a TTH in a 2.5-2.5 configuration. Evaluation of new configurations will continue.

Spring 2012 Goal 3: Increase student success in the developmental algebra sequence. As noted above in the SLO section, the departmental focus on more effective communication of course requirements, more coordination among faculty, and focus on work toward mastery of key concepts is showing positive results over the last three years.

Spring 2012 Submission Goal 5: Increase the number of student tutors employed in the Math Resource Center: We identified a weakness in meeting student support needs; there were not enough student tutor hours allotted to the MRC to meet the needs of increased student usage. We were more successful in our quest to increase the number of student tutor hours in the MRC. An additional $3300 was added to the budget for Spring 2012 and the increase ($3300) carried forward for the academic year Fall 2012-2013. Wait time for student service has decreased and student feedback in Spring 2012 was positive. (See the MRC Program Review).

B. Program Vision

What is the program's vision for sustaining and improving student learning and success during the *next six years*? Make connections to the College Mission and Diversity Statements, Institutional Priorities, 2008-2013, and other institutional planning documents as appropriate. Address trends in the SLO assessment results and student success indicators and data noted in Section II. Summary of Student and Program Data.

[*Note*: CTE programs must address changes in the context of completion and employment rates, anticipated labor demand, and any overlap with similar programs in the area as noted in Sections II.F.1 and II.F.2.]

[*Note*: Specific plans to be implemented in the *next year* should be entered in Section V.

The mathematics department sees its program as essentially three different but interconnected programs. Since the three programs provide unique challenges, each will be addressed separately in this program vision, then common needs will be discussed.

1. Developmental Math – Developmental Mathematics facilitates success and persistence among students in basic skills and below-transfer level mathematics. The courses support student completion of certificates, AA/AS degrees, and general education requirements.

As indicated in SLO discussions above and in prioritized plans below, student success and persistence in basic skills mathematics and below transfer level mathematics has long been a departmental concern. However, the current and on-going emphasis on mastery of an identified set of concepts/skills in the algebra sequence seems to be working. We envision a department that will continue to assess progress in student success and persistence in this sequence and who will cooperatively and collaboratively address new challenges as they arise. The Math 811 initiative is an example of this department culture in action. After much discussion and research into what seems to be working elsewhere the consensus was that math 811 students need more time on task, need counselor intervention when life and/or immaturity block success and need to learn how to be students as much as they need to learn arithmetic. We kept running into obstacles, but finally a plan came together and will be launched and evaluated starting in the fall. However, the plan only came together when a group of full-time faculty who do not usually teach Math 811 determined to be core faculty at that level for at least the next year. The SI program is another example of faculty working together to support a program that supports student success. The department needs more full time faculty who will dedicate part of their time to taking the lead in developmental mathematics initiatives.

2. Transfer Level Sequence– Transfer level courses meet the needs of students intending to transfer in social science, nursing, and liberal arts programs.

Again, cooperation and collaboration among faculty has led to improved student success at this level. A statistics “team” evolved over time that now includes both full-time and part-time faculty, and rich conversation between those using traditional and non-traditional approaches to teaching statistics. We envision deliberate development of teams of faculty who work together to develop strategies and pedagogies that improve student success and persistence at this level. As indicated in SLO discussions above, such an effort is bringing promising results in Math 125. We envision this type of collaboration and sharing developing around other courses at the Transfer Level. However, the department needs full-time faculty interested in these courses and in taking the lead in the effort to develop a faculty team in support of students at this level.

3. Calculus Sequence–The calculus sequence (and beyond) meets the needs of students who desire to earn an AS or AS-T in Mathematics and students intending to transfer into STEM majors.

As indicated above, SLO success and student success and persistence are highest at this level. These courses are the most mathematically challenging to teach and also, the easiest to teach. Most students arrive with acceptable ‘student’ skills. Here the challenge is to stretch the students to application in context. The department needs more multi-faceted faculty capable of challenging and being challenged by these students and at the same willing and able to accept the very different challenges of the other two sequences.

Thus we envision an enlarged full-time faculty willing and capable of taking the lead in multiple sequences of the program. We envision a faculty (full-time and adjunct) dedicated to learning and growing as instructors, with the ultimate goal of guiding as many students as possible to success in their educational goals, whether that goal be a certificate, a non-STEM AA, transfer to a non-STEM degree, or transfer to a STEM degree.

1. To guide future faculty and staff development initiatives, describe the professional enrichment activities that would be most effective in carrying out the program's vision to improve student learning and success.

   Professional development should be relevant and immediately applicable to the classroom. We encourage support for special rate funds that allow adjunct faculty to work more closely with other faculty in learning new strategies/skills, developing and enacting those ideas, and evaluating the impact on student success. We would like to see more presentations by CSM faculty to CSM faculty to encourage growth of Supplemental Instruction, Reading Apprenticeship, and other recognized "best practices" in support of student success.

2. To guide future collaboration across student services, learning support centers, and instructional programs, describe the interactions that would help the program to improve student success.

   The faculty leads of the Math Resource Center are active participants in the Learning Support Centers Coordination Committee (LSC3). We will continue to work together to seek ways to best provide student success support while becoming more efficient in how we offer services, seeking to identify and reduce duplications and investigating how by acting as a unit we can employ economies of scale. Last year's endeavors have given us a much better understanding of the roles played by the many centers on campus and lead to discussion of how we might better serve students by consolidation of services at times when our individual labs are not usually open (evenings and weekends). This idea needs further investigation especially with respect to increased funding for staff and faculty assignments and the logistics of collecting SARS data for TBA requirements when faculty with the appropriate FSA are on duty.

   Mathematics faculty have a history of working together with the BSI committee to support and improve success among basic skills students. We would like to see the current Supplemental Instruction program become institutionalized and branch out into other disciplines and know there is some interest elsewhere within our division.

   The Math 811 planning group has requested counseling faculty designated to work more closely with developmental mathematics faculty. We have evidence from our learning community experience that this interaction does lead to increased student success. We would like to see such partnerships continued and further developed.

   Within the Math Science Division a multi-disciplinary group is working together and learning together in Reading Apprenticeship. Currently Reading faculty are working and learning with us with goals of becoming better teachers and increasing student success. We would like to see this interdisciplinary effort continue to grow.

3. To guide the Institutional Planning Committee (IPC) in long-range planning, discuss any major changes in resource needs anticipated in the *next six years*. Examples: faculty retirements, equipment obsolescence, space allocation. Leave sections blank if no major changes are anticipated. Specific resource requests for the next academic year should be itemized in Section VI.A below.

Faculty: With 5 retirements and 3 hires in the last 6 years we are down two (-2) full time faculty. Three current faculty have stated that they intend to retire in the next five years. We need to hire at least three new faculty now so that new faculty benefit from the institutional memory of the well-seasoned faculty and programs continue without interruption.

Equipment and Technology: Computers are useful in helping to increase arithmetic and algebraic skills for students in Math 811, 110, 111, and 112 (i.e. Basic Skills courses). Computers are also helping in honing skills for Math 120 (Intermediate Algebra) students. There is a need for a second computer lab to aid in teaching Basic Skills Mathematics, as the present lab in 16-111 is fully employed for teaching statistics, and is probably not large enough for the estimated demand.

Optimal location for this additional classroom will be adjacent to the Math Resource Center with a connecting door and large windows in the wall so that the room may double as an extension to the MRC when classes are not in session.

In 2016, the 21 computers in 16-111, the statistics computer classroom will have reached their life expectancy and should be replaced.

Projectors in building 16 and 18 have been in service for quite a while, so a replacement plan needs to be developed.

Instructional Materials: Traditional publishing companies provide copies free to but charge students large amounts to purchase their personal copies of the text. A growing subset of the mathematics faculty are selecting high quality open-source text book that are offered inexpensively to students. The open-source publishers do not provide complementary texts to faculty and to learning centers. Many publishers only make solution manuals available to faculty as e-versions (previously we could get them as free print copies). Funds will be needed to purchase print texts and solutions manuals for faculty who prefer print. (See complete discussion in Math Resource Center Program Review.)

Classified Staff: Classified staff is needed to support the SI program and release the faculty lead from administrative and data collection to spend more time actually teaching.

Facilities: The department is in currently seeking replacement shades in mathematics classrooms due to heat absorption issues that make the classrooms overly warm. Cabling and extension cords in 16-111, the statistics computer classroom, are constantly on the floor. We are looking for solutions to this problem and may make a request of facilities in the future. The department is again requesting an additional computer classroom, preferably adjacent to the current Math Resource center.

C. Plans and Actions to Improve Student Success

Prioritize the plans to be carried out next year to sustain and improve student success. Briefly describe each plan and how it supports the Institutional Priorities, 2008-2013. For each plan, list actions and measurable outcomes.

Plan 1

Title:

Math 811 Development Group

Description

In Fall 2013 CSM will implement a new format for Math 811 Arithmetic Review with Prealgebra. The new format will increase student contact from 3 hours a week to 5 hours a week. The department is committed to building a team of fulltime and adjunct faculty to collaborate in developing, delivering, and evaluating alternative strategies to increase student success at this first developmental level and persistence into the algebra sequence. In addition, the department would like to include within the team a dedicated counselor who will get to know the students, provide early intervention, and collaborate with the faculty.

Action(s)	Completion Date	Measurable Outcome(s)
Submit Innovation Grants Application	Spring 2013	Document Submitted, funding for Spring 2013 preparatory work received.
Implement plans as described in grant application and submit report	Fall 2013	Mid-year report completed
Follow up as indicated in Grant	Summer 2014	End of year report completed
Share results with Department	August 2014	Flex meeting or email

Plan 2

Title:

Algebra Sequence Focus (year 3)

Description

As a result of multiple years of discouraging assessment results, the faculty again discussed the problems in depth during monthly math meetings and in email discussion in 2010-11 and committed to a three year emphasis on improved mastery of identified sub-objectives (started in 2011-12).

Action(s)	Completion Date	Measurable Outcome(s)
Fall and Spring informational emails distributed to faculty, follow up with new faculty	Fall 2013/ Spring 2014	Emails sent
Fall SLO analysis completed and tracked	Spring 2014	Report distributed to faculty and posted in TracDat
Get new success and persistence data from PRIE	Spring 2014	Report completed, sent to math faculty for discussion
Make curricular decisions before outline updates due in Fall 2014	Fall 2014	Revised course outlines submitted to COI

Plan 3

Title:

Supplemental Instruction

Description

Obtain funding for SI for 2013-2014 from BSI to include 10 sections with SI leaders and during the next year work with BSI, the IPC's Math Task Force, and Campus Administrators to find a way to institutionalize Supplemental Instruction.

Action(s)	Completion Date	Measurable Outcome(s)
Apply for funding for 2013-2014	Spring 2013	Done – funding received
End of Fall Semester report	Spring 2014	Report submitted to BSI committee
End of Spring Semester report	Summer 2014	Report submitted to BSI committee
Development of funding plan for (at a minimum) the next 3 academic years.	Spring 2014	IPC approval of plan

For additional plans, cut/paste from above and insert here. Or add an additional page. Number your additional plans accordingly.

[Note: Itemize in Section VI.A. Any additional resources required to implement plans.]

VI. Resource Requests

A. Itemized Resource Requests

List the resources needed for ongoing program operation and to implement the plans listed above.

Faculty

Full-time faculty requests (identify specialty if applicable)	Number of positions
Mathematics	2

Complete Full-Time Faculty Position Request Form for each position.

Description of reassigned or hourly time for prioritized plans	Plan #(s)	Cost
Reassigned Counselor (benefits not included)	1	$4200
Special rate time for Adjunct members of the team (benefits not included)	1	$3200
Special rate time for data collection and report writing (benefits not included)	1	$3300

Equipment and Technology

Description (for ongoing program operation)	Cost

New Computer Classroom (computer costs only – HP Thin Clients with monitors ~ $520 x 41)	$21,300

Description (for prioritized plans)	Plan #(s)	Cost

Instructional Materials

Description (for ongoing program operation)	Cost
Funding for purchase of print versions of e-texts for faculty	(included in MRC request)

Description (for prioritized plans)	Plan #(s)	Cost

Classified Staff

Description (for ongoing program operation)	Cost
None Requested for Department	

Description (for prioritized plans)	Plan #(s)	Cost
½ classified staff (Program Services Coordinator) – for institutionalizing of SI	3	~$40,000/year

Facilities

For immediate or routine facilities requests, submit a CSM Facility Project Request Form.

Description (for prioritized plans)	Plan #(s)	Cost
Refit of classroom to support computer classroom		Estimate requested from Facilities
Furniture for refitted classroom – tables and chairs for 40 students (assuming existing instructor table, podium, projector would remain)		$12,000-$15,000

B. Cost for Prioritized Plans

Use the resources costs from Section VI.A. above to provide the total cost for each plan.

Plan #	Plan Title	Total Cost
1	Math 811 Development Group	Grant request submitted for ~ $13500
2	Algebra Sequence Focus (year 3)	No additional cost
3	Supplemental Instruction	BSI and President's Innovation Fund grant request submitted for ~ $55,500