



Skyline College

Mathematics

Program Review

Executive Summary

Short Summary of Findings

The mathematics department works collaboratively to create a student-first, intellectually rich learning environment for all students from developmental level through transfer level courses. The department is involved in campus wide, state wide, and national projects. It works to update curriculum by searching for existing materials that match its philosophy, or finding none, by writing its own pedagogy, honed through a dedication to professional development, and to cooperate with other disciplines.

The department is eager to work with others on campus to form learning communities like Puente and Math Academy, to work on initiatives, like SLOAC and BSI, and to contribute to the campus community and the shared governance process with their work on committees like the curriculum committee, budget committee, ed policy committee, research committee, and others.

Three Strengths of the Program

- Work collaboratively to solve problems.
- Take a progressive approach to curriculum and pedagogy using professional development opportunities to stay on the cutting edge.
- Work closely with the Learning Center and the MESA Center to help enrich students' experience outside of the classroom.

Top Four Suggestions for Improvement

- Orientation process for new faculty.
- Need to determine ramifications of new AA requirements on the success of students.
- Refocus energy toward developmental/Basic Skills classes. This will require a shift to smaller class sizes, more full-time faculty, and more tutor and workshop facilitator support from the Learning Center.
- Identify and correct sources of the chronic disparity in student success.

Full-Time Faculty Signatures

Daisy Araica

Rick Hough

Soodi Zamani

John Chavez

Evan Leach

Pat Deamer

Cindy Moss

Jon Freedman

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SKYLINE COLLEGE
Mathematics
PROGRAM REVIEW SELF STUDY

PART A: Overview of Program

1. State the goals/focus of this program and how the program contributes to the mission and priorities of the College and District.

Courses in Mathematics provide a foundation for quantitative analysis, discovery, life-long learning and reasoning. In addition the program contributes to the College's mission and goals by providing:

- remedial and/or basic skills preparation
- courses that satisfy AA degree requirements
- skills necessary to complete a number of occupational programs
- coursework that fosters student growth and achievement
- an atmosphere that celebrates cultural diversity, particularly through the MESA center which is strongly supported by the Math program
- transfer requirements for QA
- a foundation for science courses

We strive to make mathematics a bridge rather than a barrier to success. The department continues to work towards increasing success and retention rates; striving to enable more students to reach their academic goals.

2. Discuss how this program coordinates, impacts, and/or interacts with other programs in the College.

The mathematics program strongly interacts with and supports various academic support services such as the MESA Program, the Learning Center, and the Disabled Students Program. Through collaboration with program directors and staff, the department works to improve student learning.

A math instructor acts as the MESA academic advisor, supporting students in the MESA Center through coordinating and developing academic workshops, working with the MESA tutors, and advising the MESA director. As much as possible, workshop facilitators and tutors work with faculty to match content in MESA with the content in the classes, and all work with small groups and one on one to match students' individual learning styles with instructor's expectations. The main calculus III instructor identified software that helps students to visualize 3D objects and concepts from class. Working with the MESA center, this software is installed on the computers in the center, and is used during workshops.

Through the Learning Center, in collaboration with the faculty teaching MATH 811, an instructor is conducting workshops to support MATH 811 students, both with problem solving

sessions as well as test preparation. As this program develops, our goal is for an increase in "time on task learning" outside of the classroom for Basic Skills students. Materials and informational posters will be developed to enhance the functionality of the Basic Skills Lab for math students.

The math faculty work closely with DSP&S to insure the smooth operations between departments when accommodations are identified.

The faculty work closely with TRIO, ASTEP, WIT, and PUENTE recommending tutors, acting as student mentors, and by providing sections dedicated to specific learning communities. Faculty teach honors sections in MATH 200, MATH 251, and MATH 241. They volunteer for Expanding Your Horizons, work with DSPS students to help provide accommodations, and collaborate with science faculty to insure that the course content prepares students for work in their classes.

The math faculty are looking forward to working with counseling and English faculty to support students in the Career Advancement Academy. Following the Gateway model, targeted returning students in Fundamentals of Math are linked with Basic Skills English are provided with personal support and counseling in a cohort-based learning environment.

Math 650, an open entry/open exit mathematics supplement course is offered by a math faculty member in the Learning Center. This course is designed for participants in the TRIO/STAARS program, a federal program designed primarily for first generation students with identified academic or economic needs. These participants receive individual tutoring and other supplemental support to improve their performance in their math classes. TRIO students do not have to pay the \$10 fee for this 0.5 unit course.

State Title V funding regulations have changed to require that all students who wish to use tutoring services must enroll in a course in order to receive services. At Skyline College this course, LSKL 800, earns 0.5 to 3.0 credits, depending on the number of hours a student spends tutoring, and entitles students to work with tutors throughout the entire semester. Non- TRIO students enrolled in a Math course may utilize 8 hours of 16 hours-by-arrangement in the TLC each semester without enrolling in LSKL 800. After the 8 hours, these students can continue to use the TLC services by signing up for LSKL 800.

3. If the program utilizes advisory boards and/or professional organizations, describe their roles.

The mathematics faculty are heavily involved with the California Mathematics Council of Community Colleges (CMC3). An affiliate of the American Mathematical Association of Two Year Colleges (AMATYC), CMC3 is the main two year college education training and advisory group in Northern California. Skyline math faculty regularly attend both CMC3 and AMATYC conferences, and have served on the CMC3 board as CMC liaison, newsletter editor, and president.

The Math department regularly evaluates the curriculum to ensure that we have taken into account new developments in community college education. We have integrated the use of technology from developmental courses through differential equations, and have infused applications based problem solving in all of our courses, two linchpins of AMATYC as well as NCTM (National Council of Teachers of Mathematics) standards.

4. Explain how this program meets the needs of our diverse community.

The student body at Skyline College has remained diverse, both culturally and in life experience and math background. This challenge is met in several ways by the math department.

Remedial classes are provided in a cohort based learning environment in coordination with the WIT, Puente, and ASTEP programs.

Faculty are recruited to refine curriculum and pedagogy to specifically meet the needs of these three groups.

Math Academy

The Math Academy adds a counseling component and tutors to the learning community model, with a counselor and tutors in the classroom so that faculty can collaborate to serve the students.

The MESA program is supported through a faculty sponsor, with course specific workshops, by recommending tutors, and helping to recruit students to the program.

Although all students are welcome to attend MESA tutoring sessions and workshops, traditionally underrepresented students are recruited more aggressively. National organizations like SACNAS, SHPE, and NSBE are promoted as ways to link students with other students around the country who are working toward the same goals.

The math faculty continue to provide volunteer hours to EYH in all aspects of the event

Faculty help with the problem solving contest, mailing, and with recruiting students to help on the day of the event.

The diverse scheduling needs of students are met with online, late start and Saturday class offerings

We are expanding our online offerings to include statistics and intermediate algebra. Saturday and late start classes are offered in algebra and statistics.

Jump Start

Jump Start is a six-week summer program designed to help high school students upgrade their skills in basic English, Mathematics, Critical thinking, and Student Success Skills. MATH 819, Mathematics Development, is a 3.0 units math class offered in this program. For eligibility to this program, students must be enrolled at a North San Mateo County high school as a junior or senior in the fall. There are no direct costs to participants who are California residents. Students are supplied with all the materials they need, including lunch, and bus passes. Participants are encouraged to stay involved with college learning by enrolling in a Learning Skills class in the fall semester at Skyline.

Gateway

As part of the Gateway program, a section of MATH 811 is taught for the current Gateway cohort. The curriculum is adjusted to be specific for that group, and math faculty work closely with the English instructor and counselor for the cohort.

5. If the program has completed a previous self-study, evaluate the progress made toward previous goals.

In an attempt to increase retention and success throughout the math program, the department has worked together with the other math departments in the district and with district IT personnel to provide computerized course prerequisite checking. Starting with MATH 120 as a test course, the program has expanded prerequisite checking to most of the program.

As a side benefit of the district math meetings, we have been working towards making the offerings and numbering of math courses uniform district wide. In addition, we have investigated changing trigonometry to include more contact hours in an attempt to increase retention and success.

PART B: Curriculum

1. Describe how the courses offered in the program meet the needs of the discipline(s) and the students. (This may be answered through descriptive narrative evaluation or quantitative research).

The curriculum includes courses that teach or review basic math skills, courses which meet specific transfer requirements for UC, CSU, IGETC, and courses that are stated prerequisites for work in fields such as biology, chemistry, business, and computer science.

Most of our students are initially placed in the non-transferable courses of Math 120 and below. Over the last few years, this disparity has increased. These courses include everyday math skills as well as introductory material for college level work. Math 110 meets our graduation requirement, and Math 120 serves as a prerequisite for all transferable math courses. The Board of Governors has recently adopted the State Academic Senate recommendation to increase the

math course requirement for an AA degree to be one course above Math 110. With this in mind, the department has been working on updating both our Math 110 and MATH 120 offerings.

Math 811, our Fundamentals of Math course has been updated by increasing the number of contact hours from 3 to 5. In addition, a small group of math faculty have been developing and using activities based materials to provide a more hands-on approach to learning basic skills math.

Some beginning courses (such as Math 110) are offered in an alternate version (Math 111-112) to allow students to work through the subject at a slower pace. Individual sections of such courses may also be directed at specific student populations such as Women in Transition, etc.

Courses above Math 120 meet IGETC and GE requirements at UC and CSU and are essential courses for math and science majors.

MATH 130 (Trigonometry), MATH 222 (Precalculus) and the two versions of calculus primarily serve students with significant math requirements at their transfer schools. MATH 251-253 is a reform calculus sequence for math/science majors and MATH 241-242 is a sequence which meets other calculus requirements (Business, Biology, etc.).

Students whose majors do not have substantial math components have additional choices to satisfy their quantitative reasoning GE requirement. MATH 150 (Math for Elementary School Teachers) was developed with an obvious goal. MATH 201 (Quantitative Reasoning) was developed for students who prefer to meet requirements outside of the traditional subdivisions such as statistics or trigonometry. MATH 200 (Statistics) is useful for math/science majors, but also provides an appropriate transfer course for such majors as Social Science, Psychology, or Business. An online version of MATH 200 has been provided to accommodate students whose schedules conflict with coming on campus for a traditional class.

2. State how the program has remained current in the discipline(s).

The department began the process of updating its curriculum by starting at the lowest level. The low retention and success rate in our Fundamentals of Math class (MATH 811) was also a reason to start at that level.

We agreed that increasing the number of contact hours was a good place to start, but were not satisfied with the content of the course, agreeing with the students that it felt too abstract and contrived to be accessible to the students. Looking through published textbooks only added to the frustration, as they all seemed to use the same outdated approach.

Activities to supplement our former textbook evolved into a 200+ page textbook of activities, exercises and explanations that we are using today. Manipulatives were created for activities, and group work was emphasized, which created classes with increased attendance.

As work on the MATH 811 class was progressing, and the new AA degree math requirements were in the process of passing, we looked toward updating our algebra offerings as well. We

heard good things about a textbook written by our colleague at CSM and used in their MATH 120 classes. We have adopted the textbook that uses real data and problem solving. This text matches the approach that is used in our upper level courses.

3. *If the student population has changed, state how the program is addressing these changes.*

The demographics of the math classes have remained relatively constant over the past six years. The number of students registering for developmental classes compared to the number of students in the transfer level courses has changed significantly. A focus on developmental courses has therefore taken priority, and it is where we have begun the SLOAC process, and for curriculum development. Once the review and update of developmental courses has progressed, the focus will continue to the remaining courses.

4. *All courses in this program should be reviewed and, if appropriate, modified every six years. If this has not occurred, please list the courses and explain.*

MATH 201 is in the process of being reviewed with SLOs in place. That review was not able to be finished by the time of the program review submission date.

5. *If external accreditation or certification is required, please state the certifying agency and status of the program.*

N/A

6. *Discuss plans for future review and program modification.*

As the SLO process proceeds and assessment plans are carried forward, we will be continuing to update our course offerings. Since we are starting with Basic Skills (Developmental) courses, during the next cycle we will proceed to transfer level courses as well as MESA courses. In addition, we will be extending the SLOAC process from the course level to the program level.

PART C: Faculty and Staff

1. *List major development activities completed by faculty and staff in this program in the last six years and state what development is needed or proposed by faculty in this program.*

The math department is committed to continuing both their own individual professional development as well as program and curriculum development.

Many of the faculty attend state and national conferences and are members of professional associations such as the California Math Council of Community Colleges (CMC³), American Mathematical Association of Two Year Colleges (AMATYC), California Math Council (CMC), National Council of Teachers of Mathematics (NCTCM) and others. Some have served as board members, and as President of CMC³, a six-year commitment.

Faculty members have applied for a received PFE and Trustees grant funding to:

- Develop an online format for Statistics
- Develop a learning video for the graphing calculator
- Develop materials for the Fundamentals of Math class

Faculty continue to develop and improve Basic Skills workshops in the Learning Center, modeled after MESA Academic Excellence Workshops and centered around problem solving and study skills needed to be successful in math.

In order to update curriculum in our algebra sequences, faculty have adopted new texts and are working with the author and publisher to modify the materials for the needs of our students.

In order to increase success and retention in our lowest class, the faculty re-worked the class to increase contact hours and has been developing materials designed specifically for our population.

2. Describe the orientation process for new faculty and staff (include student workers such as tutors and aides).

Peer tutors working in TLC are required to enroll 1.0 units of LSKL 110, Directed Experience in Tutoring. Tutors meet for one hour per week in this tutor training course with the tutorial coordinator as the instructor of record. In this class, math tutors also meet with the math specialist for specific tutor training.

At this time, the orientation process for new faculty and staff needs improvement. Full time mentors are matched with new part-timers, and all faculty are encouraged to come to department meetings, but there is a gap between what we are doing and what we could and should do.

We are working to create packets for each of the developmental classes including a list of recourses available, example syllabi, HW sets, handouts, quizzes and tests, and contact information so that faculty teaching a class for the first time will have a sense of how others are approaching the class.

3. If recruitment of new and/or diverse faculty is needed, suggest recruitment techniques.

PART D: Facilities, Equipment, Materials and Maintenance

1. Discuss the effectiveness of the facilities, equipment, equipment maintenance, and materials for the program to meet its goals and focus. Include if they impact success and if they are accessible to all students.

The math faculty widely use graphing calculators with the students. The instructor's screen is projected via an overhead projector. The faculty must either bring their own view screen with them to class, or one must be left in each of the math classrooms for instructor use. This has proven problematic.

First, if view screens are left for all to use, they break down quickly and take time to replace. Second, although the screen is projected, the buttons of the calculator are not. To remedy both of these issues, the new math classrooms in building 7 are designed to have a projection system that will project both the screen and the buttons while they are being pressed.

2. List projected needs.

Adequately sized, functioning white boards or blackboards are required in all math classrooms. As the campus moves to all whiteboards, a commitment to proper maintenance and upkeep must be made a priority. Although they allow for technology in the classroom, they are not as durable as chalkboards.

Movable desks for group work are needed in all math classrooms.

We need to create more opportunities for instructors to investigate new methods for presentation of material and interaction with students through technology. WebMathematica and Geometer's Sketchpad are interactive math software packages that enable discovery-based learning in higher level math. Tablet and clicker technology allow new modalities for student-teacher interaction.

3. Describe the use of technology in the program and discuss if technology is current and comparable to other college and business or industry.

Graphing calculators are used from beginning algebra through calculus, statistics software is used in statistics, 3DGraph is used in calculus III, and publisher supplied appropriate software is used in linear algebra and differential equations. These are comparable to other community colleges, but the industry standard is Mathematica. A way to use this to a limited extent is to purchase the software for a few calculus instructors, then to use WebMathematica to bring the interactivity to the students.

4. If appropriate, describe the support the program receives from industry. If the support is not adequate, what is necessary to improve that support?

Based on enrollment, Texas Instruments provides free calculator screen projectors.

PART E: Budget Request

1. What resources (staff, facilities, equipment and/or supplies) will be needed in the next six years?

If we truly want to increase the success of developmental/Basic Skills math students, we need to shift our perspective a little. We will need smaller class sizes, additional full-time faculty, and extra Learning Center support in terms of tutors and workshop facilitators. In addition, full-time faculty will need release time to revise curriculum to meet Basic Skills students special needs.

2. If appropriate, discuss methods the program could share resources with other programs in the College and District.

Skyline College Program Review
Worksheet for Enrollment, Performance and WSCH/FTE
Math Program Review - 2007

Weekly Student Contact Hours – WSCH

Report the 3 previous fall semesters with the most recent on the right.

Year	2004	2005	2006
WSCH	11,322	10,589	10,580

Please comment on program enrollment and expected trends.

The Math WSCH did and continues to decrease from 2004. Starting in the year 2005 prerequisites were checked at the time of registration, rather than at the first class meeting. The WSCH for fall 2007 at census has increased to 10,785 which may indicate that students are familiar with prerequisites being checked at the time of registration. This drop in WSCH was expected, but it is also expected that the WSCH will climb as students become familiar with the prerequisite checking process.

FTE and WSCH/FTE (LOAD)

Report the previous 3 fall semesters with the most recent on the right

	2004	2005	2006
FTE	17.2	17.3	17
WSCH/FTE	658	611	622

Please comment on the comparison of this program to College trends.

The Math Department is the second largest department, slightly behind English, on the campus. Loads for the same time period throughout the campus as a whole were 594 for Fall 2004, 557 for Fall 2005, and 554 for Fall 2006. For such a large department to have loads as high as those shown above is significant for the college's financial well being.

Retention and Success

Report data on program retention and success rate with the most recent on the right.

	2004	2005	2006
Retention	74%	77%	78%
Success	53%	54%	55%

Please comment on the programs success and retention rate. Include factors that affect the rates and how college services are used to provide multiple avenues for student success.

There has been an increase in both retention and success from 2004 – 2006. During this time period there has been increased emphasis by math faculty that students use the Learning Center. When looking at specific populations there are some significant findings. Female students continue to have higher success rates, although not significantly higher retention rates. The success rate for Females to Males for successive years from 2004 – 2006 is: 57%/50%, 59%/51%, 58%/52%. Of interest to note is that for the first time that recent data is available, the enrollment count for males was greater than females in 2006-07 and yet the success rate was still lower for males.

Evening students continue to have increased success and retention as compared to day students. Evening student success rate compared to day student success rate from 2004-2006 is: 64%/49%, 66%/50% and 63%/52%. This may correspond to the fact that the age group that has had the lowest success rate in all years evaluated was 18-22 year olds, the largest enrolled group by far. The highest success rate was in concurrently enrolled students.

Although overall success rate has increased from 53% to 55%, success rate for African American students has remained unchanged at 40% and appears statistically below that of all students. In addition, the success rate for Filipino students has decreased from 55% to 49%, while the success rate for Hispanic students has increased from 46% to 50% as well as those of Asian students from 54% to 61%.



Program Review Course Outline & Prerequisite Checklist

Discipline: Mathematics

Semester: Fall 2007

ALL COURSE OUTLINES MUST BE REVIEWED AND UPDATED DURING PROGRAM REVIEW!

If there are no changes made to the course outline, use the Program Review date to update the course outline. **Please note that all course outlines must now include the title of a representational text with its publication or revision date and follow the current Title V format.** Refer to *Guidelines for Preparing a Course Outlines* for further assistance.

If it is determined that a course outline needs **substantial modification**, you must complete and submit **Form D – Course Modification** to the Curriculum Committee for approval well in **advance** of your Program Review due date. Please check with your Curriculum Committee representative or go to the Curriculum Committee web site for a list of meeting dates, submission deadlines, instructions and curriculum forms to update (or modify) a course outline. (<http://www.smccd.net/accounts/skycurr/>).

List all the courses in your **discipline** on the attached form. Complete the columns on the form for each course in your discipline using the instructions below:

- Column 1:** What is the course prefix and number?
- Column 2:** What is the course title?
- Column 3:** What date was the course outline last reviewed or updated?
- Column 4:** If this course transfers to either CSU or CSU and UC, place a check mark in the appropriate column.
- Column 5:** If this course satisfies a GE (General Education) requirement, place a check mark in the column.
- Column 6:** Please list all course prerequisites, corequisites, and/or recommendations.
- Column 7:** Please indicate that the course prerequisites, corequisites, and/or recommendations have been reviewed and validated by faculty by placing a check mark in the column.

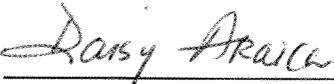
Upon submission of your Program Review materials, all course outlines should have the current date in the upper right corner. Please submit a hard copy of **each** outline from your **discipline** listed on the form with your *Program Review* materials. Additionally, all course outline **files** should be e-mailed to the Instruction Office in care of Maria Norris (norris@smccd.net).

Please have the faculty and division dean sign and date the certification on the last page.

COURSE OUTLINE & PREREQUISITE CHECKLIST							
1	2	3	4		5	6	7
Prefix & Number	Title	Review Date	Transfer		G.E.	Prerequisites, Corequisites, Recommendations	Validated
			CSU	UC & CSU			
MATH 110	Elementary Algebra	04/07				Prerequisite: MATH 811; Reccommendation: READ 836	√
MATH 111	Elementary Algebra I	04/07				Prerequisite: MATH 811; Reccommendation: READ 836	√
MATH 112	Elementary Algebra II	04/07				Prerequisite: MATH 111; Reccommendation: READ 836	√
MATH 120	Intermediate Algebra	08/07				Prerequisite: MATH 110 or MATH 112	√
MATH 122	Intermediate Algebra I	08/07				Prerequisite: MATH 110 or MATH 112	√
MATH 123	Intermediate Algebra II	08/07				Prerequisite: MATH 122	√
MATH 130	Trigonometry	08/07	√		√	Prerequisite: MATH 120 or MATH 123	√
MATH 150	Mathematics for Elementary Teachers	04/07	√	√	√	Prerequisite: MATH 120 or MATH 123	√
MATH 200	Statistics	04/06	√	√	√	Prerequisite: MATH 120 or MATH 123	√
MATH 222	Precalculus	05/06	√	√	√	Prerequisite: MATH 130	√
MATH 241	Applied Calculus I	08/07	√	√	√	Prerequisite: MATH 120 or MATH 123	√
MATH 242	Applied Calculus II	08/07	√	√	√	Prerequisite: MATH 241 and MATH 130	√
MATH 251	Calculus and Analytical Geom I	08/07	√	√	√	Prerequisite: MATH 222	√
MATH 252	Calculus and Analytical Geom II	04/07	√	√	√	Prerequisite: MATH 251	√
MATH 253	Calculus and Analytical Geom III	08/07	√	√	√	Prerequisite: MATH 252	√
MATH 270	Linear Algebra	09/07	√	√	√	Prerequisite: MATH 251	√
MATH 275	Ordinary Differential Equations	09/07	√	√	√	Prerequisite: MATH 253	√
MATH 650	Math Supplement for TRIO/STAARS	03/07				None	√
MATH 811	Fundamentals of Math	04/07				None	√

Skyline College Program Review
Certification of Course Outline & Prerequisite Review

Faculty Signatures



Daisy Araica



Rick Fough



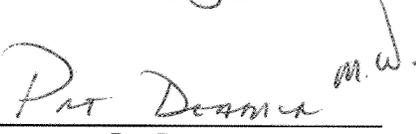
Soodi Zamani



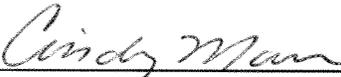
John Chavez



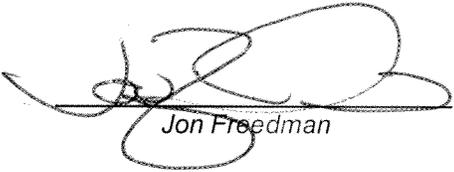
Evan Leach



Pat Deamer



Cindy Moss



Jon Freedman



Tadashi Tsuchida

Date Submitted: October 3, 2007

Division Dean: _____

(Additional faculty signature lines may be added to this form as needed.)

