PROGRAM REVIEW
CALCULUS TRACK MATH COURSES
(MATH 170, 180, 190, 191, 210, 220, 270)

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1. Overview

a) Description of Program

The College Level Mathematics Program (CM1) served 3485 students in 91 course sections during the 2010-11 school year. These courses form the core of a group of courses known as STEM (Science, Technology, Engineering, and Mathematics). The program consists of the following courses:

Math 170 – Trigonometry
Math 180 – Precalculus
Math 190 – Single Variable Calculus and Analytical Geometry I
Math 191 – Single Variable Calculus and Analytical Geometry II
Math 210 – Introduction to Discrete Structures
Math 220 – Multivariable Calculus
Math 270 – Differential Equations with Linear Algebra

CM1 Mission Statement:
The College Level Mathematics Program at El Camino College offers quality, comprehensive mathematics courses to ensure the educational success of students from our diverse community, with an emphasis on preparing students to transfer to STEM-related majors at four year colleges and universities. Students will learn to think analytically and critically, to model real world problems and to become better communicators.

CM1 students form the core of the Math Team that consistently places in the top 10% of schools nationally in the AMATYC (American Math Association of Two Year Colleges) Student Math League.

b) Information on degrees/certificates offered

Students can earn the Associate in Science Degree in Mathematics. Students must earn 19-20 units in math of which 8 units must be taken at El Camino College. The courses must include Math 190, 191 and 220. Additionally, four units must be taken from: Math 140, 150, 210, 270; Physics 1A; Computer Science I.

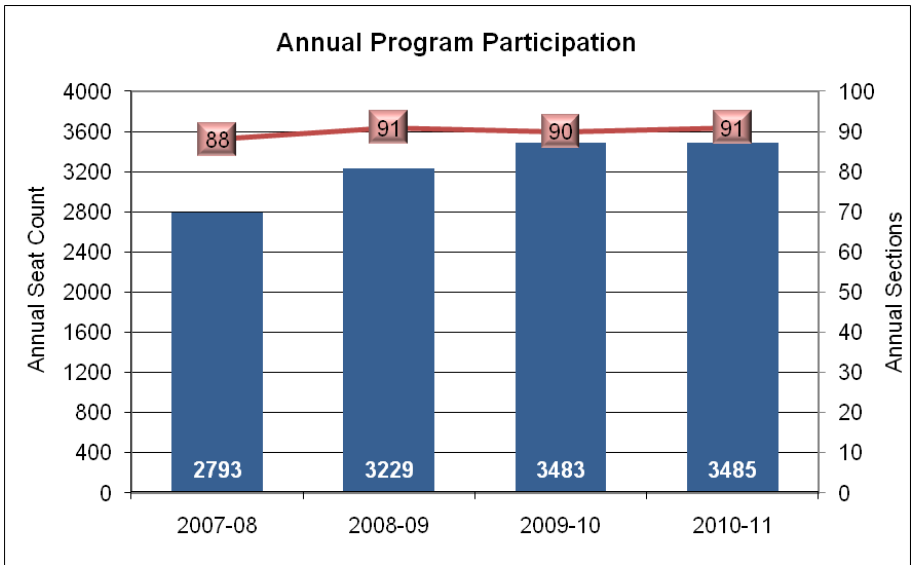
c) Status of Previous Recommendations

Since the Calculus Committee did a program review six years ago the course committee structure in the Math Department has been reorganized. Courses from several smaller committees were merged into one umbrella committee, named the CM1 Committee, encompassing the core STEM courses. There were no pending recommendations from the previous committees.

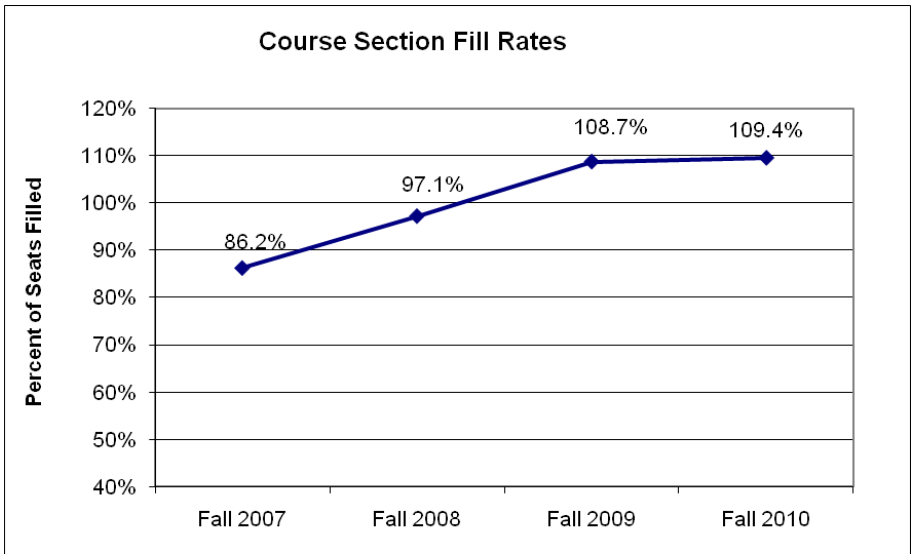
2. Analysis of Institutional Research Data

Enrollment Rates

We are pleased that our enrollment increased 25% from 2793 students in 2007-08 to 3485 students in 2010-11 despite the number of sections holding steady from between 88 and 91 sections during that time.



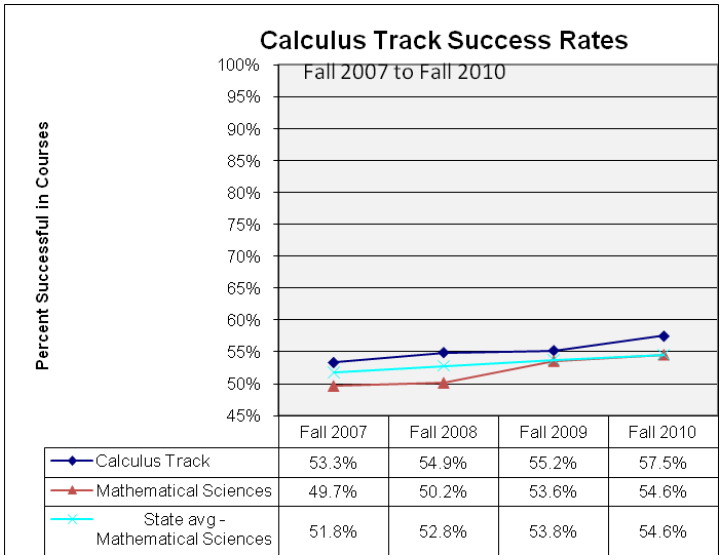
We attribute much of this to the budget cuts in the UC and Cal State system. More students are attempting to take their transfer level math courses at El Camino College. The CM1 level math instructors have been very accommodating as attested to by the large increase in the course section fill rates, which accounts for the huge enrollment increase despite the fact that there has been no change in the number of sections.



The 86.2% fill rate in Fall 2007 translates to 30.1 students per section while the 109.4% fill rate in Fall 2011 translates to 38.3 students per section. The fact that there are 8 students more per section over 91 sections accounts for about 700 additional students enrolled in 2011 when compared to 2007.

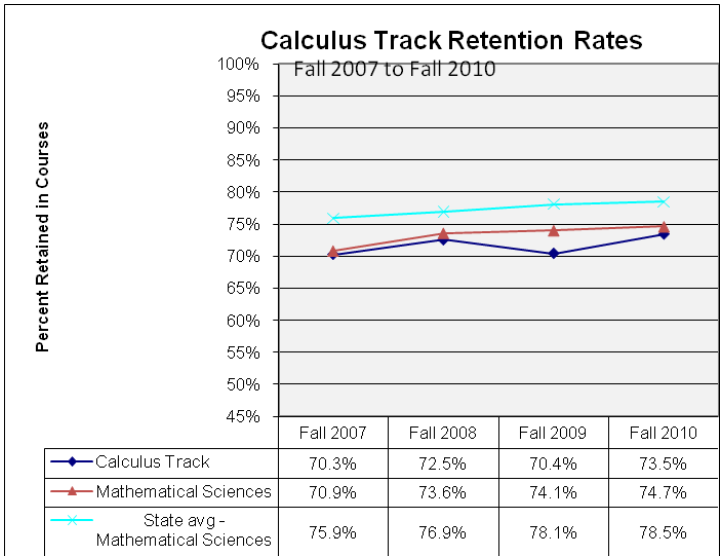
Program Success and Retention Rates - Overall

We are pleased that our overall success rates have been trending up and are higher than the department and state averages in math. The overall rate increased from 53.3% in Fall 2007 to 57.5% in Fall 2010.



	Fall 2007	Fall 2008	Fall 2009	Fall 2010
Calculus Track	53.3%	54.9%	55.2%	57.5%
Mathematical Sciences	49.7%	50.2%	53.6%	54.6%
State avg - Mathematical Sciences	51.8%	52.8%	53.8%	54.6%

The retention rates are slightly lower than the state averages, but are similar to the department averages.



	Fall 2007	Fall 2008	Fall 2009	Fall 2010
Calculus Track	70.3%	72.5%	70.4%	73.5%
Mathematical Sciences	70.9%	73.6%	74.1%	74.7%
State avg - Mathematical Sciences	75.9%	76.9%	78.1%	78.5%

Success Rates By Course

We looked at the success rate data for CM1 courses from Fall 2006 to Spring 2011 (see attachment for detailed data) and we note these ranges:

The success rates for Math 170 have ranged from 45-58%.
The success rates for Math 180 have ranged from 46-58%.
The success rates for Math 190 have ranged from 51-59%.
The success rates for Math 191 have ranged from 45-62%.
The success rates for Math 210 have ranged from 52-80%.
The success rates for Math 220 have ranged from 55-77%.
The success rates for Math 270 have ranged from 60-85%.

We note that the success rate ranges fluctuate up and down – there is no discernible upward or downward trend. The later courses in the sequence, Math 210, 220 and 270, tend to have a higher success rate. This is likely due to the fact that the students who reach these courses are well prepared by their success in the earlier courses and are more motivated as they get closer to transferring to a four-year college.

We are continually looking for ways to increase student success rates. Three ways that would help immensely would be increasing the number of MESA workshops, introducing SI, and improving the Math Study Center.

MESA (Mathematics Engineering Science Achievement) is a program that provides academic support to students from educationally disadvantaged backgrounds. Currently there are workshops geared towards most of our STEM level courses. Students from all sections of a particular course are encouraged to attend these workshops which are led by a peer facilitator. Funding for more of these workshops would be helpful.

SI (Supplemental Instruction) is a series of weekly review sessions for students enrolled in selected courses. This differs from the MESA approach in that an SI Coach is assigned to a particular course section so that the review sessions can be geared towards the way an individual instructor is teaching a course. Research has shown that the SI method has helped students to increase their understanding of course material and to raise grades, as shown by Irene Graf and by the increase in success rates of our Basic Skills program. There are no SI sections for STEM courses at this time. Funding for SI in CM1 would benefit our STEM students.

The Math Study Center is a tutoring center that includes both professional and peer tutors. The professional tutors have a Bachelor's Degree or higher in math and primarily assist students in transfer level, mostly STEM, courses. The peer tutors are current students who help others based on their own level of expertise. We have the opportunity to reinvent the Math Study Center when we move to a new building next year. We support access to both technology and the internet, and also a reserve desk in the new center – these needs will be addressed later. Funding for additional tutors and extended hours would help our students become more successful. We also support a new tutor screening process that involves more input from the math faculty. Costs will be discussed in Facilities, Section 5.

Data pertaining to the performance of successful students in subsequent classes would be helpful.

Survey Analysis – The official survey results are on the next page.

A survey of 1197 students was conducted in November 2011. See the table starting on the next page for the results.

Based on the results, we observe that more than half of the total students enrolled in CM1 courses are majoring in engineering and trying to transfer to one of the UC campuses. Approximately 57% of the students took Math 70 or 80, the prerequisite classes for our STEM courses. We have no data on how the remaining students were placed. In the next survey we should ask about the first math class taken at El Camino by the student and how they received placement into that class, i.e. by placement test, AP credit or transferred units.

The survey shows that less than 11% or 128 of our current students have completed more than 60 units at El Camino. These are either the returning students with no degree, or returning students with degrees working toward another degree.

Nearly one-third of the respondents were unable to add a CM1 course or the immediate prerequisite course, Math 80, in the past two years because the Math 80 sections filled so quickly. We believe that more sections of all the courses should be added to the schedule, especially multiple sections of Math 80, 170, 180, 190. The cost for each new section is estimated to be $8,000-$13,000. This will be discussed further in the Curriculum section.

The survey shows that 171 students plan to take Math 210 while at El Camino College. Math 210 is Discrete Math, which is essential for Math and Computer Science Majors. The need for more sections of Math 210 will be discussed in the Curriculum section.

It is encouraging to see that a majority (678 out of 1172) of our students are looking for post-AS degrees from colleges and universities throughout the state.

The data show that only 32% of our CM1 students used the Math Study Center in MCS 106. We recommend raising student awareness of this center. When we move to the new building the study center should be enhanced and modernized to make it more attractive to students. For example, computer stations along the walls have been recommended. A reserve desk where students can check out textbooks or technology for use in the center would also be helpful. Costs will be discussed in Facilities, Section 5.

College Math Student Survey Fall 2011

N = 1,197

1. Which math course are you enrolled in this semester?

Response	Frequency	Percent	Mean: 3.3
Math 80	278	23.4	
Math 170	221	18.6	
Math 180	199	16.8	
Math 190	188	15.8	
Math 191	164	13.8	
Math 210	1	0.1	
Math 220	81	6.8	
Math 270	56	4.7	

2. What is your intended major?

Response	Frequency	Percent	Mean: 4.9
Mathematics	66	5.8	
Physical Sciences	88	7.7	
Life Sciences	153	13.4	
Computer Science	116	10.2	
Engineering	311	27.3	
Business/Economics	162	14.2	
Humanities	8	0.7	
Other	236	20.7	

3. How many units have you completed at El Camino (not including this semester)?

Response	Frequency	Percent	Mean: 2.4
Less than or equal to 15 units	399	34.1	
From 16 to 30 units	277	23.7	
From 31 to 45 units	232	19.8	
From 46 to 60 units	135	11.5	
More than 60 units	128	10.9	

4. Which math courses have you completed at El Camino?

Response	Frequency	Percent	Mean: -
Int Algebra [M 70 or 80]	483	57.1	
College Algebra [M 130]	99	11.7	
Trig [M170]	320	37.8	
Precalculus [M 180]	297	35.1	
Calc I [M190]	260	30.7	
Calc II [M191]	125	14.8	
Calc III [Math 220]	63	7.4	
Linear Alg/Diff Eq [M 270]	9	1.1	
Discrete Math [M210]	5	0.6	

5. Which math courses do you plan to take at El Camino?

Response	Frequency	Percent	Mean: -
Math 170	175	17.0	
Math 180	281	27.3	
Math 190	465	45.1	
Math 191	498	48.3	
Math 220	386	37.4	
Math 270	365	35.4	
Math 210	171	16.6	

6. In the past two years, were you unable to add a mathematics course because all the sections were full?

Response	Frequency	Percent	Mean: 0.3
Yes	361	31.1	
No	801	68.9	

7. If you answered Yes to question (6), which math courses were you unable to add?

Response	Frequency	Percent	Mean: -
Math 80	145	41.1	
Math 170	64	18.1	
Math 180	69	19.5	
Math 190	71	20.1	
Math 191	34	9.6	
Math 210	4	1.1	
Math 220	17	4.8	
Math 270	7	2.0	

8. Which type of textbook do you prefer?

Response	Frequency	Percent	Mean: 1.5
Hardback book	701	62.1	
Paperback book	301	26.7	
e-book or other online resources	127	11.2	

9. If you took the Placement Exam, what do think about the level where you were placed?

Response	Frequency	Percent	Mean: 2.5
Too low	324	27.4	
Too high	33	2.8	
Just right	726	61.4	
Did not take placement test	99	8.4	

10. Which technology or computer programs have you used in your math classes?

Response	Frequency	Percent	Mean: -
Mathematica	269	24.3	
MathLab	110	9.9	
Excel	50	4.5	
Graphing Calculator	836	75.6	
Other	212	19.2	

11. What is your desired transfer college or university?

Response	Frequency	Percent	Mean: 4.4
CSULB	131	14.8	
CSUDH	34	3.8	
UCLA	175	19.7	
USC	71	8.0	
CSU [other than CSULB and CSUDH]	91	10.3	
UC [other than UCLA]	221	24.9	
Other	164	18.5	

12. Do you use the campus library for research or homework?

Response	Frequency	Percent	Mean: 0.7
Yes	787	66.2	
No	401	33.8	

13. Which of the following campus resources have you used?

Response	Frequency	Percent	Mean: -
MESA	316	34.3	
Math Study Center [MCS 106]	297	32.3	
Counseling	512	55.7	
Writing Lab	247	26.8	
A Student Club	69	7.5	
Instructor Office Hours	412	44.8	

14. If you have used the Math Study Center (MCS 106), how would you describe the experience?

Response	Frequency	Percent	Mean: 2.0
Very helpful	147	18.4	
Somewhat helpful	157	19.7	
Not helpful	42	5.3	
Have not used	451	56.6	

15. Which college degree is your ultimate educational goal?

Response	Frequency	Percent	Mean: 3.0
Associate's	32	3.1	
Bachelor's	278	27.1	
Master's	412	40.2	
Doctorate	266	26.0	
other	37	3.6	

List related recommendations:

We recommend that the new Math Study Center be designed to be more dynamic and inviting, by having tutors who actively move around the room and encourage questions and discussion. In In addition, we recommend that a reserve desk be available for students to check out books or technology for use in the center. (cost discussed in Facilities section)

We recommend that more MESA workshops be funded. (cost: $1,400 per section).

We recommend that Supplementary Instruction (SI) be funded for some of the STEM courses. (cost: $1,500 to $1,800 per coach per section)

We recommend that our next survey be designed to elicit more detailed information about how students were placed, what course they intend to take in the next semester, and what resources students are using outside of class that they find effective.

3. Curriculum—Course, Content, and Articulation

a) Provide the curriculum course review timeline to ensure all courses are reviewed at least once every six years.

Course	Last Review	Next Review
Math 170	**2008-09**	**Fall 2013**
Math 180	**2009-10**	**Spring 2014**
Math 190	**2007-08**	**Fall 2012**
Math 191	**2008-09**	**Spring 2013**
Math 210	**2008-09**	**Spring 2015**
Math 220	**2008-09**	**Fall 2014**
Math 270	**2009-10**	**Fall 2015**

b) Explain any course additions to current course offerings.

At this time, there are no plans for adding any new courses to the College Level Mathematics Program.

There is interest in splitting Math 270, Differential Equations and Linear Algebra, into two separate courses. Many local community colleges offer Differential Equations and Linear Algebra separately. This could increase the flexibility of our motivated students as they prepare for transfer. The CM1 Committee will research this idea by contacting 4-year universities and local community colleges, and will address this further in the Math 270 course review.

c) Explain any course deletions from current course offerings.

There are no course deletions from current course offerings

d) Have all courses that are required for your program's degrees and certificates been offered during the last two years?

All required courses have been offered in the past two years.

e) Discuss any concerns regarding department/program's courses and their articulation.

All of our courses articulate with the UC and Cal State systems.

More sections of all CM1 Courses Needed

We are concerned that we are not meeting the demands of students for college-level transfer courses. We are happy that we prepare so many students for transfer, but we could do more.

The El Camino website states that it frequently has the #1 admission rates to UCLA of all community colleges in Southern California. However, this measures the ratio of acceptances to applications. A more salient measure is the absolute number of acceptances. For example,

according to the UCLA Admissions website, in 2010 our rate was slightly better than Santa Monica College (SMC) 35.6% to 35.4%. However, in raw numbers they had 663 acceptances out of 1875 applicants while we had 184 out of 517, so they really beat us by 260% in students actually admitted, but the schools are similar in size.

We both have good reputations for preparing STEM students for transfer. We hope this continues.

However, we are concerned with the huge disparity in the number of CM1 course offerings between the two schools. See Appendix A for a comparison of the numbers of CM1 sections offered by specific course at SMC vs. ECC. Last year SMC offered 36% more sections of CM1 courses than ECC. We are concerned that we may lose students to Santa Monica College and other nearby schools that offer more CM1 course sections. We may further lose CM1 students to SMC when ECC's Winter Session is dropped. SMC offers a Winter Semester that includes crucial calculus courses that motivated students want to take.

As our full waitlists and packed classes (109% seat fill rate last year) indicate, there is significant demand for more CM1 courses. Large numbers of students are turned away each semester. If there were more sections, we would be able to increase our transfer numbers. Additionally, a larger number of CM1 sections increases our pool of talent for student tutoring, MESA facilitators, SI coaches and Math Team members.

We recommend two additional sections each of Math 170, 180 and 190 per semester. We recommend one additional section of Math 191, 220 and 270 per semester. We recommend the addition of Math 210 in the Fall Semester.

Discrete Math – Math 210 – Adding One More Section

Math 210 (Discrete Math), a requirement for Computer Science majors, is currently offered once a year in the Fall. However, we can easily fill a second section in the Spring. The course is unique in that it is our only course that focuses on methods of proof, essential for any Computer Science in the analysis of algorithms. It is equally useful for any Math major.

This course was previously offered twice a year, but in 2003 it was reduced to once a year due to the decline in Computer Science enrollment and the slump in the Computer industry. This paralleled a decrease in the number of Computer Science sections – there were over 20 sections offered in Fall 2001, but this dropped to a low of 7 sections in recent semesters.

However, the Computer industry has rebounded and the demand for Computer Science courses has greatly increased, as has the demand for Discrete Math. The STEM student survey shows that 171 students plan to take Math 210 while at El Camino College. This doesn't even include Computer Science students, most of whom would indicate that they need the course. Offering a single section of this class allows us to serve only 35 students each year.

We recommend the addition of one more section of Math 210 in the Fall Semester each year.

Intermediate Algebra – Math 80 – the Prerequisite for CM1

Prior to Fall 2009 there were over 100 sections of Math 70 offered each year. This Intermediate Algebra course is the main prerequisite for CM1 courses.

There were 55 sections of this course in Fall 2008. However, in the Fall 2009 semester Math 70 (renamed Math 80) was drastically reduced to 9 sections. A new Intermediate Algebra course, Math 73 (Intermediate Algebra for General Education), was offered with 37 sections, but this course was not designed to prepare students for CM1 courses.

The creation of this new course, Math 73, was in response to California's change in the Title 5 regulations about Associate Degrees. The new guidelines raised the requirements from Elementary Algebra to Intermediate Algebra. The new course removed many topics and was not deemed an appropriate preparation for CM1 courses.

The disparity in section offerings between Math 80 and Math 73 continued in the subsequent years. The decrease in the number of Math 80 course sections is of serious concern because this chokes off the main access point for students to our CM1 courses, which form the backbone of a solid math and science education. Math- and science-related fields will be increasingly important for the future of our country's economy.

We researched the ways that other area schools addressed the new Title 5 rules. Most of the top local transfer schools (Pasadena CC, Orange Coast CC, LA CCD) chose to create two semester versions of their old Intermediate Algebra courses rather than to omit topics. Other schools, such as Santa Monica College, created new Intermediate Algebra courses, but did not make them the dominant course. Since Santa Monica (SMC) has the highest number of transfers to UCLA, we chose to compare the number of sections of Intermediate Algebra offered at their school and at ours:

Summer 2010 – Spring 2011 Combined

ECC Course	Sections		SMC Course	Sections	
Math 73	82		Math 18	24	
Math 80	26		Math 20	83	

Summer 2011 – Spring 2012 Combined

ECC Course	Sections		SMC Course	Sections	
Math 73	73		Math 18	26	
Math 80	33		Math 20	82	

Each chart represents a one-year cycle through four academic terms: Summer, Fall, Winter, Spring. The data from individual semesters can be found in the appendix.

SMC's comparable Math 73 course is Math 18, however it serves solely as a conduit to Statistics and Finite Math. Most of their students still have to take the traditional, more comprehensive

version of Intermediate Algebra, which is Math 20 at their school. The comparison is rather dramatic: They offer about three times as many sections in their Math 20 than we offer in our comparable Math 80. We offer far more of our Math 73 in a similar ratio. This discrepancy might be one of the reasons that SMC has triple the number of applicants to UCLA that El Camino does.

It is possible for successful Math 73 students to enter the CM1 track by taking Math 130 (College Algebra) since this course covers some Math 80 topics that are not in Math 73. Although this is a possible solution for students in this situation, it delays them by a semester.

Students may get clearance to go directly from Math 73 to Math 170 based on the consideration of multiple factors as required by state regulations. These include transcripts from high school and other colleges, placement test scores, grade in Math 73 and recommendations of Math 73 instructors. However, we are concerned that this may circumvent the carefully considered prerequisites for Math 170. We feel that this is not a good idea since Math 80 is a great place for students to develop the necessary maturity to be able to handle the advanced courses they will encounter when they transfer. It would be a disservice to a student entering Math 170 not to have been exposed to an intensive course like Math 80. Additionally, due to the limited number of Math 170 sections, these cleared students from Math 73 could displace successful and better prepared Math 80 students.

We feel that this problem could be addressed by offering several more sections of Math 80 and supplementing all Math 80 courses with Supplemental Instructions (SI) workshops or MESA workshops. This is vital to the continuation and growth of our STEM math sequence as well as the STEM science courses. Our long time math and engineering counselors, Madeleine Carteron and Ken Key, as well as the Division Curriculum Committee, support this position.

f) Discuss the degrees. If few students receive degrees, should the program's criteria or courses be re-examined?

A small number of students receive their Associate Degree in Math. In the three years from 2008 to 2010 we averaged 22 degrees each year. However, in the last year we saw a significant increase. The number of degrees our department awarded increased to 48 in 2011. We will try to increase this number, but the primary goal of most of our students is to transfer, with the goal of receiving a Bachelor's Degree, so many are more concerned with fulfilling transfer requirements. Nothing is wrong with our degree criteria, but we will try to increase the number of degrees.

g) List of related recommendations.

We recommend that more sections of all CM1 level courses be offered. It is estimated that each new section has a cost of $8,000-$13,000.

We recommend that Math 210 be offered in both the Spring and Fall Semesters. (cost $13,000)

We recommend that Winter Semester be expanded rather than eliminated – it was never really given a proper chance to succeed. A six-week semester can replace the current five-week version with no delay to the start of Spring Semester other than rescheduling the February Flex Day. Some of us believe we can and should offer 4 and 5 unit STEM courses during winter. The success rates of these courses at other schools are very good, and they are complete rather than abbreviated versions of the courses. Such a move might attract international students who can't go home during winter and who can afford to pay out-of-state tuition rates. (cost $8,000-$13,000 per section).

We recommend more research be done into whether Math 270 should be split into two courses: Linear Algebra and Differential Equations. (no cost)

4. Student Learning Outcomes (SLOs)

a) List each course and program level SLO in the discipline.

Please see Appendix B for a list of all the CM1 courses and their SLOs. The course SLOs are categorized into four (non-overlapping) subsets according to program level SLOs. The CM1 program level SLOs are as follows:

> **Program SLO #1:** Students will analyze problems, recognize appropriate methods of solution, solve the problems, and explain and interpret the solutions.
> **Program SLO #2:** Students will demonstrate and explain mathematical concepts using a variety of methods.
> **Program SLO #3:** Students will see and appreciate the nature of mathematical rigor and understands the common features and concepts of mathematical thought and practice.
> **Program SLO #4:** Students will construct proofs relevant to the course concepts and content.

Program level SLO #1 is comprised of the following course level SLOs. Once the course level assessments are completed, the program level assessment is summarized.

- **Math 170 SLO-1** Students will use trigonometry to solve application problems.
- **Math 180 SLO-3** Solve problems involving arithmetic and geometric sequence and series.
- **Math 180 SLO-6** Students will solve application problems at the pre-calculus level and use mathematical induction to write proofs.
- **Math 190 SLO-3** Students will use derivatives to solve application problems involving rates of change and optimization.
- **Math 191 SLO-1** Students will use integration to solve application problems involving areas between curves, volumes by washers and cylindrical shells, arc length and areas of surfaces of revolution.
- **Math 191 SLO-4** Students will solve problems using Taylor series, including differentiation and integration of power series.
- **Math 210 SLO-2** Students will use functions, sequences and series to analyze computer science structures, and analyze the complexity of the algorithms that use them.
- **Math 210 SLO-4** Students will use combinatorics and probability to model, solve and prove a variety of counting problems.
- **Math 220 SLO-2** Find the unit vector tangent to a given space curve at a given point.
- **Math 220 SLO-4** Find the standard form of the plane tangent to given surface at a given point.
- **Math 270 SLO-5** Student will use Laplace transform to find particular solutions directly for both o.d.e. (ordinary differential equations) and systems of linear o.d.e.

Program level SLO #2 is comprised of the following course level SLOs. Once the course level assessments are completed, the program level assessment is summarized**.**

- **Math 170 SLO-2** Students will graph trigonometric functions and their inverses.

- **Math 180 SLO-4** Students will graph algebraic, exponential, logarithmic, and trigonometric functions, and sketch functions in polar and parametric forms.
- **Math 190 SLO-1** Students will demonstrate understanding of limits, continuity, and the definition of the derivative of a single-variable function.
- **Math 191 SLO-5** Students will solve problems involving parametric equations, polar coordinates and conic sections.
- **Math 210 SLO-3** Students will use number theory to find factorizations, common multiples and factors, perform modular arithmetic, and prove important results.
- **Math 220 SLO-1** Find the equations of lines and planes in 3 dimensional space.
- **Math 270 SLO-3** Student will find or approximate solutions of o.d.e. algebraically**,** graphically, and **numerically**.

Program level SLO #3 is comprised of the following course level SLOs. Once the course level assessments are completed, the program level assessment is summarized**.**

- **Math 170 SLO-4** Students will solve trigonometric equations.
- **Math 170 SLO-5** Students will find the unknown sides and angles of triangles.
- **Math 170 SLO-6** Students will use trigonometry to work with vectors and complex numbers
- **Math 180 SLO-1** Students will find zeros of polynomial functions by factoring polynomials using polynomial division and the factor theorem.
- **Math 180 SLO-2** Students will solve algebraic, exponential, logarithmic, trigonometric, absolute value equations, and systems of equations using matrices.
- **Math 180 SLO-7** Students will solve quadratic and rational inequalities and inequalities with absolute values.
- **Math 190 SLO-2** Students will find derivatives of single-variable elementary functions.
- **Math 190 SLO**-4 Students will find anti-derivatives of simple elementary functions and apply them to determining definite integrals.
- **Math 190 SLO-5** Students will apply the technique of change of variable to evaluating anti-derivatives.
- **Math 190 SLO-6** Student will be able to use the Fundamental Theorem of Calculus
- **Math 191 SLO-2** Students will evaluate integrals, both proper and improper, using integration techniques including integration by parts, trigonometric substitutions, partial fraction decomposition and numerical techniques to approximate the values of integrals.
- **Math 220 SLO-3** Calculate partial derivatives for a function of more than one variable.
- **Math 220 SLO-5** Evaluate a double integral.
- **Math 270 SLO-1** Student will solve both linear and nonlinear 1^{st} and 2^{nd} order ordinary differential equations (o.d.e) and higher order linear o.d.e and their applications
- **Math 270 SLO-4** Student will solve systems of o.d.e., especially with eigenvalues & eigenvectors in order to effectively solve linear systems of o.d.e.

Program level SLO #4 is comprised of the following course level SLOs. Once the course level assessments are completed, the program level assessment is summarized.

- **Math 170 SLO-3** Students will prove trigonometric identities.

- **Math 180 SLO-5** Students will prove trigonometric identities using the sum, difference, double-angle, and half-angle formulas.
- **Math 191 SLO-3** Students will determine the convergence or divergence of sequences, series and power series.
- **Math 210 SLO-1** Students will use logic and set algebra to analyze statements and arguments, and use these ideas to write proofs using a variety of methods.
- **Math 210 SLO-5** Students will solve problems and write proofs in graph theory.
- **Math 270 SLO-2** Student will understand linear algebra (linear system, matrix, determinant, vector space, linear transformation) as a first step to generalize the procedure to solve higher order linear o.d.e.

b) Provide a timeline for the four-year cycle for course and program level SLO assessments.

3 Years before Program Review	
Fall Semester 2010	Math 170 SLO-4 (solve trigonometric equations) – PL3 Math 190 SLO-5 (change of variable to evaluate anti-derivative) – PL3
Winter 2011	None
Spring Semester 2011	Math 170 SLO-1 applications of trigonometry – PL1 Math 180 SLO-3 sequences and series – PL1 Math 190 SLO-3 rates of change and optimization – PL1 Math 191 SLO-1 applications of integration – PL1 Math 210 SLO-2 algorithm complexity – PL1 Math 210 SLO-4 combinatorics and probability – PL1 Math 220 SLO-2 space curve and unit tangent vector – PL1 Math 220 SLO-4 tangent plane to surface – PL1 Math 270 SLO-5 Laplace transform – PL1
2 Years before Program Review	
Fall Semester 2011	Math 180 SLO-6 applications and inductive proof – PL1 Math 191 SLO-4 power series – PL1 Math 170 SLO-2 graphs of trig functions and their inverses – PL2 Math 180 SLO-4 graphing curves – PL2 Math 190 SLO-1 limits, continuity, definition of derivative – PL2 Math 220 SLO-1 lines and planes in space – PL2 Math 270 SLO-3 approximate ordinary differential eqns – PL2
Winter 2012	None
Spring Semester 2012	Math 191 SLO-5 parametric and polar curves – PL2 Math 210 SLO-3 number theory – PL2 Math 170 SLO-5 find unknown sides, angles of triangles – PL3 Math 180 SLO-1 zeros of polynomials – PL3 Math 190 SLO-2 compute derivatives – PL3 Math 220 SLO-3 partial derivatives – PL3 Math 270 SLO-1 solve ordinary differential equations – PL3
2 Years before Program Review	
Fall Semester 2012	Math 180 SLO-6 applications and inductive proof – PL1 Math 191 SLO-4 power series – PL1 Math 170 SLO-2 graphs of trig functions and their inverses – PL2 Math 180 SLO-4 graphing curves – PL2 Math 190 SLO-1 limits, continuity, definition of derivative – PL2 Math 220 SLO-1 lines and planes in space – PL2 Math 270 SLO-3 approximate ordinary differential eqns – PL2

Winter 2012	None
Spring Semester 2013	Math 191 SLO-5 parametric and polar curves – PL2 Math 210 SLO-3 number theory – PL2 Math 170 SLO-5 find unknown sides, angles of triangles – PL3 Math 180 SLO-1 zeros of polynomials – PL3 Math 190 SLO-2 compute derivatives – PL3 Math 220 SLO-3 partial derivatives – PL3 Math 270 SLO-1 solve ordinary differential equations – PL3
1 Years before Program Review	
Fall Semester 2013	Math 170 SLO-6 vectors and complex numbers – PL3 Math 180 SLO-2 solve equations and systems of equations – PL3 Math 190 SLO-4 use anti-deriv. to eval. definite integrals – PL3 Math 191 SLO-2 techniques of integration – PL3 Math 220 SLO-5 double integral – PL3 Math 270 SLO-4 eigenvalues and eigenvectors – PL3
Winter 2013	None
Spring Semester 2014	Math 180 SLO-7 solve inequalities – PL3 Math 190 SLO-6 Fundamental Theorem of Calculus – PL3 Math 170 SLO-3 prove trigonometric identities – PL4 Math 191 SLO-3 show convergence or divergence – PL4 Math 210 SLO-1 logic and proof – PL4 Math 210 SLO-5 graph theory – PL4 Math 270 SLO-2 linear algebra – PL4
Program Review Year	
Fall Semester 2013	Math 180 SLO-5 prove trigonometric identities – PL4
Winter 2013	None
Spring Semester 2014	None scheduled

c) Describe the assessment results and explain the recommended/implemented changes resulting from the course and program level SLO assessment. Analyze the changes that were implemented.

So far CM1 has assessed two Program Level SLOs. See Appendix C for the recently compiled results for Program level #1 plus more SLO results since the last program review. The rubric used by CM1 is as follows.

Excellent (Strong understanding of concept and strong computational skill)
Satisfactory (Medium understanding of concept and medium computational skill)
Unsatisfactory (Weak understanding of concept and weak computational skill)

Some things we have learned from SLO assessments

As CM1 teachers are assessing their students' achievements in accordance with student learning objectives, we have asked teachers to reflect on the results. Here are some of the suggestions we have collected.

- Interpreting word problems is an important skill, but not unique to trigonometry. Suspect students did not have enough exposure to such word problems in previous math courses. Suggest more word problems in algebra classes.

- Because of trying to finish the last Precalculus chapter in the week prior to final exams, students didn't get too much exposure to the topic of sequences and series. Next time, recommend adjusting the pace to allow for more time on this topic so that students have more time to work through exercises before the exam.

- Next time have students practice Calculus I optimization problems in class.

- Next time have the students practice more on integrating trigonometric functions. Encourage the students to get additional help by visiting instructors during office hours, participating MESA workshop, getting help at the Math Study Center or forming study groups with classmates. Students in the unsatisfactory category also need to improve their computation skills (how to integrate). Faculty can encourage students to review their integration techniques.

- Those Calculus III students who didn't attend and didn't participate in class discussions were not as successful as those who did. More in-class example exercises might help more students succeed. Encourage more class participation.

Program-level #1(Students will analyze problems, recognize appropriate methods of solution, solve the problems, and explain and interpret the solutions). Assessment was done in Spring 2012.

> In summary, a total of 1035 students were assessed from 37 sections across the program with 518 Excellent; 263 Satisfactory; and 254 Unsatisfactory. The overall success rate (excellent or satisfactory) was 75%. These results are very good. The analyses written by individual faculty provide ideas on how to obtain even stronger results.

Program-level #3(Students will see and appreciate the nature of mathematical rigor and understands the common features and concepts of mathematical thought and practice) was assessed during **Spring 2010 semester:**

> The students from across the program were given a problem that tested their ability to graph a function and utilize its application in solving problems. A total of 812 students were assessed from 28 sections across the program with 348 Excellent; 300 Satisfactory; and 164 Unsatisfactory. The overall success rate (excellent or satisfactory) was 80%.

d) Based on the ACCJC Rubric for SLOs, determine and discuss the program's level of SLO/ Assessment implementation: Awareness; Development; Proficiency; or Sustainable Continuous Quality Improvement.

CM1 has successfully passed through the first three levels of SLO implementation: Awareness, Development, and Proficiency. This is because two Program Level SLOs have been assessed and at least three cycles of a course level SLO has been completed for every course in CM1. CM1 is currently working within the Sustainable Continuous Quality Improvement (SCQI) level.

Within the SCQI level, CM1 has achieved the following characteristics:

- Student learning outcomes and assessment are ongoing, systematic and used for continuous quality improvement.

- Dialogue about student learning is ongoing, pervasive and robust.

- Learning outcomes are specifically linked to program reviews.

CM1 has not yet achieved the following characteristics of the SCQI level:

- Evaluation of student learning outcomes processes.

- Evaluation and fine-tuning of organizational structures to support student learning is ongoing.

- Student learning improvement is a visible priority in all practices and structures across the college.

These last characteristics are expected to be achieved before the next CM1 program review. CM1 can do this through a faculty-led workshop held each semester with a focus towards highlighting what teaching techniques have worked to improve student learning and what techniques should be updated.

e) List related recommendations.

Since the last program review SLO assessments have become an accepted part of the CM1 faculty's job. When course level SLOs and program level SLOs are assessed faculty are involved in completing the report. In the next year all faculty should be familiar with how to enter SLO summary reports into the CurricuNET database.

Since the last CM1 Program Review many faculty have been involved in SLO assessments and analysis. Over the last three semesters (Fall 2010, Spring 2011, Fall 2011) a total of eleven different faculty have taken the role of CM1 Course Coordinator. The responsiveness from the faculty teaching these courses is very good. Our experience has been that when a teacher is asked by the Course Coordinator to collect SLO assessment information from their students most faculty comply by the end-of-semester deadline.

It is the responsibility of the Course Coordinator to collect SLO assessments from the faculty teaching the course and then to summarize the collected results and analyses. The Course Coordinator enters the summarized results and analyses directly into CurricuNET.

Early in the semester, sometime before the eighth week, each Course Coordinator distributes a "CM1 SLO Assessment Collection Template" to each faculty teaching the course. The collection template is included in Appendix D.

Recently, seven CM1 faculty attended the first CurricuNET training for Math Division SLO Course Coordinators. The training was held during the week of February 20, 2012. The purpose

of the training was to have each course coordinator learn how to enter their Fall 2011 SLO assessment summary into CurricuNET. It is recommended that all course level and program level assessment summaries be entered into CurricuNET during the first two weeks of the following semester and shared with CM1 faculty.

5. Facilities, Equipment, and Technology

a) Describe and assess the adequacy and currency of the facilities, equipment, and technology used by the program/department.

Including two large lecture halls, the Mathematics Department currently has fifteen smart classrooms (that has an instructor station equipped with computer and audiovisual equipment, allowing the instructor to teach using a wide variety of media through a data projector) in the present MCS (Math Computer Science) building. There are also three smart mobile classrooms at the MBBM (Manhattan Beach Blvd Modules). There are twenty full-time faculty offices, five adjunct faculty offices, one instructor workroom, and two computer labs in the basement of MCS as well as one Math Study Center for students.

Currently, there are only five smart classrooms with document cameras. All classrooms have an overhead projector, and instructors are responsible for their maintenance. A mobile computer projector is available for instructors to reserve in advance and check out for non-smart classroom use.

In addition, we have a total of one hundred eighty computers including classroom sets, administrative computers and common work area computers. Most of these computers are outdated and only fifty-eight of these are still under warranty. Four of our five printers are no longer under warranty. There are also two laptop carts located in the locked, back closet of room MCS 213; each cart has seventeen laptops for instructors to check out for classroom use.

Aside from the online resources (*CourseCompass, WebAssign)* that publishers of textbooks offer, the following software are also available in most smart classrooms for the Calculus Track Mathematics Program: *David Parker's Graphing Program, Goldstein's TI-83 Trainer, Mathematica 8.0, Scientific Notebook 5.5, Texas Instrument's SmartView* and *Adobe Creative Suite 5.5 (Deluxe Premier Edition).* A limited number of *Scientific Notebook 5.5, Mathematica 8.0, and TI-84 Smart Views* are available for faculty home use, and Division approval is required. Moreover, *Adobe Creative Suite 5.5* is only available for installation on ECC-owned laptops.

The Math Department has approximately 158 TI graphing calculators for instructors to bring to class and a limited number of calculators from the Calculator Loan Program available for students. These calculators, however, are shared with other Mathematics programs such as Algebra and General Education. The Calculus Track Mathematics Program, however, does not yet have sets designated for our advanced students.

The Math Department is hopeful that some of current deficiencies (lack of smart classrooms and outdated technological equipments) will be addressed when we move into the new MBA (Mathematics, Business and Allied Health) building in August 2012. This new building (76,340 square feet) will house the Division of Mathematical Sciences as well as the Business Division and Allied Health Division. Mathematical Sciences will occupy 33,884 square feet and share 2,340 square feet with the Business Division.

In this new building, the Mathematics Department will have a total of thirty-three faculty offices (140 square feet each): sixteen on the second floor and seventeen on the third floor. The current plan is to have twenty full-time faculty offices and ten adjunct faculty offices. Each full-time faculty office will be shared by two faculty, and each adjunct faculty office will be shared by six faculty. There will be 3 unoccupied faculty offices, anticipating new hires in the future. In addition, there will be-two large lecture rooms (1600 square feet each), twenty-three classrooms (800 square feet each), three computer classrooms (900 square feet each), one tutoring center (1600 square feet), and one computer lab.

b) Explain the immediate (1-2 years) needs related to facilities, equipment, and technology.

According to ITS, the new building will be equipped with a software-controlled classroom projection system. All projection needs can be set up on the computer screen, and instructors can schedule their needs to be ready by class time. We have heard that all classrooms will have document readers, but this isn't completely clear. It is extremely helpful to have document readers installed in classrooms used by the Calculus Track Mathematics Program. A typical document reader costs $350-$500.

Although the new facilities in the MBA building are designed to accommodate the needs of the Mathematical Sciences Division, there will still be a need for up-to-date technology (hardware and software) for the Calculus Track Mathematics Program. For example, Wolfram's *Mathematica* requires an annual maintenance renewal of approximately $8,000 per year. This provides for the concurrent use of *Mathematica* on 88 computers shared between the two campuses (ECC campus and Compton campus), 27 ECC owned laptop licenses, and 88 home-use licenses.

In addition, the Calculus Track Program Committee will need several classroom sets of graphing calculators and non-graphing scientific calculators designated for our students. The cost (including battery replacements) of a standard graphing calculator is approximately $100 - $125 each and the cost of a scientific calculator (including battery replacement) is approximately $20 - $25 each.

c) Explain the long-range (2-4 years) needs related to facilities, equipment, and technology.

When the state budgetary crisis is settled, we anticipate that the demand for new full-time hires will rise due to an increase in student enrollments, faculty retirements, and the mandate to balance full-time to part-time loads. Therefore the amount of office space will not be adequate for the long term faculty needs of the department. It is impossible to estimate costs because we cannot project future requirements. In addition, a faculty library will be needed to store reference books due to lack of shelf space in the new faculty offices. A faculty office may be converted for this purpose.

To keep up with the latest technological teaching innovations, SmartBoards should be installed in each classroom. This technology provides the instructors with an opportunity to write in color on the computer image to emphasize important points during lecture and discussion. It will cost approximately $30,000-$40,000 to have SmartBoards installed in each of our smart classrooms.

In addition, some CM1 instructors are currently using free online whiteboard technology through http://www.cccconfer.org/index2.aspx during their online office hours. Some type of whiteboard technology should be provided in every office for online office hours. It is very important for CM1 instructors to be able to sketch on a whiteboard pad instead of trying to type a complicated response to students' mathematical questions during online office hours. It is also recommended that we have whiteboard technology at our new tutoring center for online tutoring. Installation of such technology costs between $2,500 and $5,000 per whiteboard.

Finally, the new building will provide us space for a larger tutor center.
These are some suggestions from the Tutoring Committee:

- Arrange the tables in a circular format to promote student interaction.
- Divide tutoring center into two sections including a quiet room.
  Alternative suggestion for noise: Bose Quiet Comfort headphones valued at $300 each.
- Request that faculty hold office hours in the center.
- Post teaching schedules and office hours in the tutoring center for tutors that may need additional assistance.
- In addition to passing math 180 as a requirement to tutor, it is suggested that tutoring candidates should pass a tutoring demonstration administered by members of the tutoring committee. The purpose is to ensure quality control.
- Request two desk top computers to be used by math students completing computer-related math homework exercises.
- Request that a software-qualified fulltime (or part-time) teacher work a limited schedule (say computer help is available 4 hours per day in the Math Study Center). We could vary the four-hour timeslot from day to day.
- Request TI Graphing Calculators for the tutoring center.
- Request Scientific Calculators for the tutoring center.
- A reserve desk where students can check out books and technology for use in the center.

d) List related recommendations (when applicable).

1. Funding should be established to maintain equipment (document readers, laptops, calculator sets), retain currency (license renewals of *Mathematica*, *Scientific Notebook*), and provide for innovative technologies (SmartBoards, tablet PCs, advance whiteboard technology) in the classrooms and faculty offices. We estimate that this will cost between $80,000 and $100,000.
2. There will be a need to hire a full-time staff to supervise and maintain the new computer lab in MBA. Depending on education and experience, the annual salary

is between $55,000 and $70,000. We highly recommend Dr. Donna Post, currently our technology specialist, who is shared by Natural Science, for the full-time position.

3. Installation of Whiteboard technology at the new tutoring center is recommended. The cost is estimated to be $2,500 to $5,000 per whiteboard.
4. The Math Department will need to have office space for a faculty library to store references and teaching tools. We recommend that a faculty office be converted for this purpose.

6. Staffing

We compared the number of sections taught full time and part time faculty. The staffing data is obtained from published schedules of classes and should therefore be considered approximate since changes to the official schedule are often made after the publication of the schedule.

College Level Mathematics Program

	Math 170		Math 180		Math 190		Math 191		Math 210		Math 220		Math 270		Total Sections
	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	
Winter 2007	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Spring 2007	3	5	7	0	7	2	5	1	1	0	2	1	2	0	36
Summer 2007	2	2	1	3	4	0	0	2	0	0	1	1	0	0	16
Fall 2007	6	3	7	3	8	1	5	0	0	0	2	1	2	0	38
TOTAL	14	10	15	6	19	3	10	3	1	0	5	3	4	0	
%FT	58.3333		71.4286		86.3636		76.9231		100		62.5		100		

%FT Overall: 73.118

	Math 170		Math 180		Math 190		Math 191		Math 210		Math 220		Math 270		Total Sections
	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	
Winter 2011	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Spring 2011	6	3	8	2	9	0	7	0	1	0	2	0	2	0	40
Summer 2011	3	1	2	1	3	1	0	4	0	0	1	1	0	0	17
Fall 2011	4	4	6	3	8	1	5	1	0	0	3	0	2	0	37
TOTAL	16	8	16	6	20	2	12	5	1	0	6	1	4	0	
%FT	66.6667		72.7273		90.9091		70.5882		100		85.7143		100		

%FT Overall: 77.32

The number of sections offered by the College Level Mathematics Program is up 4.3% from 2007 to 2011, and the ratio of full-time to part-time faculty meets California Community College requirements. Given this data, one would assume that no changes need to be made.

However, in the past, faculty routinely added students beyond the normal maximum number of students for their classes. Even so, large numbers of students must still be turned away. With fee increases and enrollment restrictions occurring in the University of California system and the California State University system, this situation will clearly only worsen in the future. It is time that some sense of social responsibility is expressed, and that staffing be increased to meet these needs.

It is recommended that we hire 4 full-time tenure track professors to bring our department total to 44 (cost estimate - $90,000 per year).

7. Direction and Vision

(a) Are there any changes within the academic field/industry that will impact the program in the next four years?

Our primary reference is the publication "Beyond Crossroads, Implementing Mathematics Standards in the First Two Years of College", November, 2006, from the American Mathematical Association of Two-Year Colleges (AMATYC).
According to this document the expectations of students in mathematics-intensive programs are to:

1. Develop an appreciation of mathematics as a whole and of the historical development of mathematics.
2. Develop a solid understanding of functions from multiple perspectives.
3. Be able to use numerical, graphical, symbolic and verbal representations to solve problems and communicate with others.
4. Use technology as a tool for exploring mathematical concepts.
5. Use a variety of mathematical models including curve fitting.
6. Develop an ability to work with mathematical abstractions, analyze mathematical relationships, make plausible conjectures, projections and develop proofs.
7. Develop an understanding of concepts and skill needed for future mathematics courses or courses in related disciplines.

We believe that the courses that comprise the CM1 program address these issues very well. We will continue to explore new ways to incorporate all of these ideas so as to help increase student learning and success.

(b) Explain the direction and vision of the program and how you plan to achieve it.

The primary vision of the CM1 Program is to provide the community with a comprehensive and dynamic mathematics curriculum that will not only strengthen the math skills of our students, but will also bolster their efforts in all STEM courses. This will lead to higher success rates, graduation rates and transfer rates. We must strive to be a department that will attract students near or far. The local area population is aging and there are expected to be fewer school-aged children in future. CM1 will respond to this vision by maintaining our high standards, by continuously reviewing our curriculum, and by keeping up with educational trends at local colleges and nationally.

Our vision is a teaching environment that encourages faculty and students to share ideas and explore. Some teachers do this by offering student projects that go beyond course content and allow interested students to learn more than what is in the course outline. The use of Mathematica for projects, for example, allows students the opportunity to investigate mathematical concepts on their own. Encouraging faculty to share their ideas, student

projects or teaching ideas at Brown Bags would foster a more stimulating educational atmosphere.
Our vision is that more students get involved in national math associations such as the Mathematics Association of America (MAA) or AMATYC. One way to do this is for math faculty to encourage greater participation in and better preparation for the AMATYC Math Competition.

(c) How does the program fulfill the college's mission and align with that strategic initiatives?

The CM1 Program offers quality, comprehensive programs and services that help our students achieve educational success. For CM1 students the end result of this is the ability to transfer to a four-year college and succeed.

7. Prioritized Recommendations

Recommendation 2012A: (Increase Course Offerings) It is recommended that Math 210 be offered in both the Fall and the Spring Semesters on a permanent basis. Also, it is recommended that at least two additional section of Math 170, 180, and 190 and at least one additional section of Math 191, 220 and 270 be added to the schedule each semester. Also, a significant increase in the number of Math 80 sections offered is recommended (Curriculum) ($8,000-$13,000 each)

Recommendation 2012B: (Faculty Hiring) It is recommended that four more Full-Time tenure track professors be hired beyond our present count of forty. If is further recommended that CM1 courses be taught by full-time instructors only. (Staffing) ($90,000 per hire)

Recommendation 2012C: (Technology) It is recommended that a long-range, sustainable plan to purchase and use the most up-to-date version of the software and hardware used in the courses in this program be implemented and that newer technologies are investigated for possible introduction to the General Education Mathematics Program. Additionally classroom sets of graphing calculators and scientific calculators should be purchased. (see Facilities and Technology section for cost breakdowns)

Recommendation 2012D: (Facilities) It is recommended that funding be provided for an expanded tutoring center. Perhaps some ins tructor office hours could take place in the tutoring center. Computers and a reserve desk, stocked with textbooks and calculators, should be added. (see Facilities and Technology section for cost breakdowns).

Recommendation 2012E: It is recommended that SI sections be funded for CM1 courses and that funding be increased for MESA workshops. (cost $1500 per section)

Recommendation 2012F: It is recommended that funding be increased for conferences and professional development.

Recommendation 2012G: (SLOs) It is recommended that we work to increase participation of faculty, both full time and part time, in the administration, reporting and analysis of SLOs. Additionally, we should continue to develop and review the SLO statements and assessments and update relevant course outlines on a regular basis. (cost is $0)

APPENDIX A

CM1 Courses – Sections Offered

EL CAMINO COLLEGE vs SANTA MONICA COLLEGE

Spring 2010

ECC Course	Sections		SMC Course	Sections
Math 73	30		Math 18	9
Math 80	7		Math 20	34
Math 170 Math 180	8 8		Math 2	14
Math 190	8		Math 7	13
Math 191	6		Math 8	7
Math 220	2		Math 11	3
Math 270	2		Math 13 (LA) Math 15 (DE)	2 2
Math 210	1		Math 10	1
CM1 Totals	35			42

Summer 2010

ECC Course	Sections		SMC Course	Sections
Math 73	8		Math 18	4
Math 80	3		Math 20	8
Math 170 Math 180	3 3		Math 2	5
Math 190	3		Math 7	5
Math 191	3		Math 8	4
Math 220	1		Math 11	2
Math 270	0		Math 13 (LA) Math 15 (DE)	0 2
Math 210	0		Math 10	0
CM1 Totals	13			18

Fall 2010

ECC Course	Sections		SMC Course	Sections
Math 73	42		Math 18	9
Math 80	10		Math 20	35
Math 170 Math 180	8 9		Math 2	18
Math 190	8		Math 7	12
Math 191	5		Math 8	6

Math 220	3		Math 11	3
Math 270	2		Math 13 (LA) Math 15 (DE)	2 2
Math 210	0		Math 10	1
CM1 Totals	35			44

Winter 2011

ECC Course	Sections		SMC Course	Sections
Math 73	0		Math 18	2
Math 80	0		Math 20	6
Math 170 Math 180	3 0		Math 2	4
Math 190	0		Math 7	3
Math 191	0		Math 8	2
Math 220	0		Math 11	1
Math 270	0		Math 13 (LA) Math 15 (DE)	0 1
Math 210	0		Math 10	0
CM1 Totals	3			19

Spring 2011

ECC Course	Sections		SMC Course	Sections
Math 73	32		Math 18	9
Math 80	13		Math 20	34
Math 170 Math 180	9 10		Math 2	14
Math 190	9		Math 7	13
Math 191	7		Math 8	7
Math 220	2		Math 11	3
Math 270	2		Math 13 (LA) Math 15 (DE)	2 2
Math 210	1		Math 10	1
CM1 Totals	40			42

Summer 2011

ECC Course	Sections		SMC Course	Sections
Math 73	8		Math 18	5
Math 80	4		Math 20	7
Math 170 Math 180	3 3		Math 2	6
Math 190	4		Math 7	5
Math 191	3		Math 8	3
Math 220	1		Math 11	1
Math 270	0		Math 13 (LA) Math 15 (DE)	0 1

Math 210	0		Math 10	0
CM1 Totals	14			16

Fall 2011

ECC Course	Sections		SMC Course	Sections
Math 73	41		Math 18	9
Math 80	12		Math 20	35
Math 170 Math 180	8 9		Math 2	19
Math 190	8		Math 7	13
Math 191	6		Math 8	7
Math 220	3		Math 11	3
Math 270	2		Math 13 (LA) Math 15 (DE)	3 2
Math 210	0		Math 10	1
CM1 Totals	36			48

Winter 2012

ECC Course	Sections		SMC Course	Sections
Math 73	0		Math 18	3
Math 80	0		Math 20	6
Math 170 Math 180	2 0		Math 2	5
Math 190	0		Math 7	5
Math 191	0		Math 8	2
Math 220	0		Math 11	1
Math 270	0		Math 13 (LA) Math 15 (DE)	0 1
Math 210	0		Math 10	0
CM1 Totals	2			14

Spring 2012

ECC Course	Sections		SMC Course	Sections
Math 73	24		Math 18	9
Math 80	17		Math 20	34
Math 170 Math 180	7 9		Math 2	15
Math 190	9		Math 7	13
Math 191	7		Math 8	7
Math 220	2		Math 11	3
Math 270	2		Math 13 (LA) Math 15 (DE)	2 2
Math 210	1		Math 10	1
CM1 Totals	37			43

APPENDIX B
CM1 Course Descriptions and SLOs

Math 170 - Trigonometry

Catalog Description:
This course includes a study of trigonometric functions, their inverses, trigonometric identities, equations, complex numbers, graphs of trigonometric functions, and applications. **Note:** One year of high school geometry is equivalent to Mathematics 60.

Student Learning Objectives

1) Students will use trigonometry to solve application problems.

2) Students will graph trigonometric functions and their inverses.

3) Students will prove trigonometric identities.

4) Students will solve trigonometric equations.

5) Students will find the unknown sides and angles of triangles.

6) Students will use trigonometry to work with vectors and complex numbers

Math 180 - Precalculus

Catalog Description:
This course is preparation for Calculus. Topics of study include polynomial, rational, exponential, logarithmic and trigonometric functions as well as their inverses. An introduction to matrices, analytic geometry, and sequences and series are also included. The application of these topics is stressed to enhance conceptual understanding of the material.

Student Learning Objectives

1) Students will find zeros of polynomial functions by factoring polynomials using polynomial division and the factor theorem.

2) Students will solve algebraic, exponential, logarithmic, trigonometric, absolute value equations, and systems of equations using matrices.

3) Solve problems involving arithmetic and geometric sequence and series.

4) Students will graph algebraic, exponential, logarithmic, and trigonometric functions, and sketch functions in polar and parametric forms.

5) Students will prove trigonometric identities using the sum, difference, double-angle, and half-angle formulas.

6) Students will solve application problems at the pre-calculus level and use mathematical induction to write proofs.

7) Students will solve quadratic and rational inequalities and inequalities with absolute values.

Math 190 – Calculus I

Catalog Description:
Topics in this course include: limits; derivatives of algebraic, trigonometric and transcendental functions; differentials; graphing; applications; definite and indefinite integrals. Problem solving using a computer algebra system is integrated throughout the course.

Student Learning Objectives

1) Students will demonstrate understanding of limits, continuity, and the definition of the derivative of a single-variable function.

2) Students will find derivatives of single-variable elementary functions.

3) Students will use derivatives to solve application problems involving rates of change and optimization.

4) Students will find anti-derivatives of simple elementary functions and apply them to determining definite integrals.

5) Students will apply the technique of change of variable to evaluating anti-derivatives.

6) Students will be able to use the Fundamental Theorem of Calculus.

Math 191 – Calculus II

Catalog Description:
This course includes a study of: methods of integration; applications; improper integrals; numerical integration; infinite sequences, series and power series; parametric equations, polar coordinates and conic sections.

Math 191 Student Learning Objectives

1) Students will use integration to solve application problems involving areas between curves, volumes by washers and cylindrical shells, arc length and areas of surfaces of revolution.

2) Students will evaluate integrals, both proper and improper, using integration techniques including integration by parts, trigonometric substitutions, partial fraction decomposition and numerical techniques to approximate the values of integrals.

3) Students will determine the convergence or divergence of sequences, series and power series.

4) Students will solve problems using Taylor series, including differentiation and integration of power series.

5) Students will solve problems involving parametric equations, polar coordinates and conic sections.

Math 210 – Discrete Math

Catalog Description:

This course is a study of mathematical ideas and techniques to analyze problems and algorithms which occur in Computer Science. Topics covered include: logic, set algebra, functions, algorithms, the integers, mathematical induction, elementary matrix algebra, mathematical reasoning, combinatorics, recurrence relations, relations, graphs and trees.

Math 210 Student Learning Objectives

1) Students will use logic and set algebra to analyze statements and arguments, and use these ideas to write proofs using a variety of methods.

2) Students will use functions, sequences and series to analyze computer science structures, and analyze the complexity of the algorithms that use them.

3) Students will use number theory to find factorizations, common multiples and factors, perform modular arithmetic, and prove important results.

4) Students will use combinatorics and probability to model, solve and prove a variety of counting problems.

5) Students will solve problems and write proofs in graph theory.

Math 220 – Multivariable Calculus

Catalog Description:

Solid analytic geometry, vector algebra, partial derivatives, line surface and volume integrals, multiple integrals, vector field theory, Green's Theorem, Stoke's Theorem and Gauss' Theorem are topics included in this course.

Math 220 Student Learning Objectives

1) Find the equations of lines and planes in 3 dimensional space.

2) Find the unit vector tangent to a given space curve at a given point.

3) Calculate partial derivatives for a function of more than one variable.

4) Find the standard form of the plane tangent to given surface at a given point.

5) Evaluate a double integral.

Math 270 - Differential Equations withLinear Algebra

Catalog Description:
This course consists of a study of first-order ordinary differential equations, systems of linear equations, matrices, determinants, vector spaces, linear transformations, linear second-order ordinary differential equations, power series solutions, numerical methods, Laplace transforms, eigenvalues, eigenvectors, systems of linear differential equations and applications.

Math 270 Student Learning Objectives

1) Student will solve both linear and nonlinear 1^{st} and 2^{nd} order ordinary differential equations (o.d.e) and higher order linear o.d.e and their applications

2) Student will understand linear algebra (linear system, matrix, determinant, vector space, linear transformation) as a first step to generalize the procedure to solve higher order linear o.d.e.

3) Student will find or approximate solutions of o.d.e. algebraically**,** graphically, and numerically.

4) Student will solve systems of o.d.e., especially with eigenvalues & eigenvectors in order to effectively solve linear systems of o.d.e.

5) Student will use Laplace transform to find particular solutions directly for both o.d.e. and systems of linear o.d.e.

APPENDIX C

Spring 2012

Program Level learning objective #1

Students will analyze problems, recognize appropriate methods of solution, solve the problems, and explain and interpret the solutions.

SLO	Assessment	# Sect. Assessed	Excellent *	Satis factory *	Unsatis factory*	
Math 170 SLO-1	Spring 2011	6	**69**	**32**	**29**	
Math 180 SLO-3	Spring 2011	4	**38**	**30**	**36**	
Math 180 SLO-6	Fall 2011	6	**60**	**43**	**58**	
Math 190 SLO-3	Spring 2011	6	**86**	**37**	**45**	
Math 191 SLO-1	Spring 2011	5	**89**	**40**	**47**	
Math 191 SLO-4	Fall 2011	3	**40**	**26**	**14**	
Math 210 SLO-2	Spring 2011	1	**24**	**3**	**1**	
Math 210 SLO-4	Spring 2011	1	**23**	**4**	**1**	
Math 220 SLO-2	Spring 2011	2	**31**	**32**	**7**	
Math 220 SLO-4	Spring 2011	2	**49**	**11**	**10**	
Math 270 SLO-5	Spring 2011	1	**9**	**5**	**6**	
TOTALS		**37**	**518**	**263**	**254**	**1035**
Portion			**50%**	**25%**	**25%**	

* Numbers of Students

Excellent (Strong understanding of concept and strong computational skill)

Satisfactory (Medium understanding of concept and medium computational skill)

Unsatisfactory (Weak understanding of concept and weak computational skill)

Analyses (“changes to be made”) collected from the SLO Summary Assessment Reports:

- Interpreting word problems is an important skill, but not unique to trigonometry. Suspect the students did not have enough exposure to such word problems in previous math courses. Suggest more word problems in algebra.
- Because of trying to finish Precalculus chapter 11 in the week prior to finals, the students didn't get too much exposure to this section. Next time, faster pace towards the end, and spend more time on the material so that students get a chance to practice it.
- Next time have students practice this Calculus I Optimization problem type in class.
- Next time, have the students practice more on integrating trigonometric functions Encourage the students to get additional help by visiting instructors during office hours, participating MESA workshop, getting help at Tutoring Center, or forming study group with classmates. Students in the unsatisfactory category also need to improve their computation skill-how to integrate. Faculty can encourage students to review their integration techniques.
- Excellent test results. Recommend adding a section of Math 210 to Fall Semester to give more students a chance to excel and to be exposed to math beyond Calculus.
- Those Calculus III students who didn't attend, and didn't participate in class discussions, were not as successful as those who did. More in-class example exercises might help more students succeed. Encourage more class participation.
- This one Math 270 Linear Algebra and Differential Equations class meets from 6:30 to 9:00 pm. The class was exhausted. The next time suggest do one of two things. Give a separate test on Laplace transform and power series or put the Laplace transform stuff at the beginning of the final exam.

More SLO results

These results are prior to Fall 2010

Courses with assessments:
Course Level SLO (assessment, analysis of data, and a submitted report) has been conducted for Math 170,180,190,191,210,220,and 270. The grading rubric for all the course and program level SLOs is based on 3 categories as follows:
Excellent *(strong understanding of concept and strong computation skill)*
Satisfactory *(medium understanding of concept and medium computation skill)*
Unsatisfactory *(weak understanding of concept and weak computation skill)*

MATH 170:

SLO#1: (Student will use Trig to solve application problems), and
SLO#5:(Student will find the unknown sides of triangles) was assessed during the **Fall 2009 semester.** In 2 different sections a total of 55 student results were assessed with 22 Excellent; 7 Satisfactory; and 26 Unsatisfactory. The overall success rate (excellent or satisfactory) was 53%.

SLO#2:(Student will graph Trig functions) was assessed during the **Fall 2009 semester**. In 4 different sections a total of 128 student results were assessed with 62 Excellent; 15 Satisfactory; and 51 Unsatisfactory. The overall success rate (excellent or satisfactory) was 60%.

SLO#2: (Student will graph trig functions) was assessed during the **Spring 2010 semester.** In 4 different sections a total of 151 student results were assessed with 62 Excellent; 65 Satisfactory; and 24 Unsatisfactory. The overall success rate (excellent or satisfactory) was 84%.

SLO#4(Students will solve trigonometric equations) was assessed during **Fall 2010 semester.** In 8 different sections a total of 172 student results were assessed with 72Excellent; 60 Satisfactory; and 40 Unsatisfactory.The overall successes rate (excellent or satisfactory) was 77%.

SLO#1 (Students will use trigonometry to solve application problem) was assessed during the **Spring 2011 semester.** In 6 different sections a total of 130 student results were assessed with 69 Excellent; 32 Satisfactory; and 29 Unsatisfactory.The overall success rate (excellent or satisfactory) was 78%.

MATH 180:

SLO#2 (Students will solve trigonometric equation) was assessed during the **Spring 2009 semester.** A total of 125 students were assessed from five different sections. The success rate was 45%.

SLO#1 (Student will find zeros of polynomials using polynomial division and the factor theorem) was assessed during the **Spring 2009 semester.**A total of 130 students were assessed from five different sections. The success rate was 53%.

SLO#2 (Students will solve trigonometric equation) was assessed during the **Fall 2009 semester.** A total of 105 students were assessed from 4 different sections. 47 or 45% scored "excellent". 25 or 24% scored "satisfactory". 33 or31% scored "unsatisfactory" The success rate was 69% .

SLO#1 (Student will find zeros of polynomials using polynomial division and the factor theorem) was assessed during the **Fall 2009 semester.**A total of 105 students were assessed from four different sections. 43 or 41% scored "excellent". 32 or 31% scored "satisfactory". 30 or28% scored "unsatisfactory" The success rate was 72% .

SLO#4 (Student will graph polynomial function using its zeros and end behavior) was assessed during the **Spring 2010 semester.** A total of 211 students were assessed from eight different sections. 83 or 39% scored "excellent". 69 or 33% scored "satisfactory". 59 or28% scored "unsatisfactory" The success rate was 72%

SLO#3(Solve problems involving arithmetic and geometric sequence and series) was assessed during the **Spring 2011 semester.** In 4 different sections a total of 104 student results were assessed with 38 Excellent; 30 Satisfactory; and 36 Unsatisfactory. The overall success rate (excellent or satisfactory) was 66%.

Math 190:

SLO#1 (Understanding the concept of limit numerically, graphically and algebraically) was assessed during **Spring 2008 semester**. Students did well on the graphical and numerical determination of limits; the mean score on the graphical determination of a limit was 4.12 with standard deviation 1.12. For the numerical determination of a limit, the mean score was 4.05 with standard deviation of 1.54, both out of 5 points. However, students had a mean score of 3.56 (out of 5) on finding a limit using algebraic techniques with standard deviation of 1.34. The committee was pleased with these results overall, and felt that they were about right for these questions. But the committee feels that more could be done to improve student performance in regard to finding a limit via algebraic manipulation.

SLO#3 (Students will use derivatives to solve application problems involving rates of change) was assessed during the **Fall 2008 semester.** Analysis: Results were very good. Over two sections of Math 190, students achieved 4.26/5.0 = 85% success on Question 1 and 3.84/5.0=77% success on Question 2.

SLO#3 (Students will use derivatives to solve application problems involving optimization) was assessed during the **Fall 2009 semester**. In 7 different sections a total of 180 student results were assessed with 89 Excellent; 44 Satisfactory; and 47 Unsatisfactory. The overall success rate (excellent or satisfactory) was 74%.

SLO#2(Students will find *first and second derivatives to describe the behavior of a function) was assessed during the* ***Spring 2010 semester.*** . In 7 different sections a total of 194 student

results were assessed with 78 Excellent; 80 Satisfactory; and 36 Unsatisfactory. The overall success rate (excellent or satisfactory) was 81%.

SLO#5*(Students will apply the technique of change of variable to evaluating anti-derivatives) was assessed during* ***Fall 2010 semester.*** In 6 different sections a total of 156 student results were assessed with 79 Excellent; 51 Satisfactory; and 26 Unsatisfactory. The overall success rate (excellent or satisfactory) was 83%.

SLO#3 (Students will use derivatives to solve application problems involving rates of change and optimization)was assessed during **Spring 2011 semester.** In 6 different sections a total of 168 student results were assessed with 86 Excellent; 37 Satisfactory; and 45 Unsatisfactory. The overall success rate (excellent or satisfactory) was 73%.

Math 191:

SLO#5(Student will solve problems involving polar graphs) was assessed during **Spring 2010 semester.** In 6 sections a total of 142 student results were assessed with 69 Excellent; 42 Satisfactory; and 31 Unsatisfactory. The overall success rate (excellent or satisfactory) was 78%.

SLO#1(Students will use integration to solve application problems involving areas between curves, volumes by washers and cylindrical shells, arc length and areas of surfaces of revolution.) was assessed during **Spring 2011 semester.** In 5 sections a total of 176 student results were assessed with 89 Excellent; 40 Satisfactory; and 47 Unsatisfactory. The overall success rate (excellent or satisfactory) was 74%.

MATH 210:

SLO#2 (Given an algorithm written in pseudo-code, students will define an algorithm, determine the output of the algorithm and determine the worst case complexity of the algorithm) was assessed during **Spring 2009 semester.** In 1 section a total of 30 student were assessed. The overall success rate was 83%.

SLO#5 (*Graph the adjacency matrix) was assessed during* ***Spring 2010 semester.*** In 1 section a total of 19 student were assessed. The overall success rate (excellent and satisfactory) was 89%.

SLO#2(Students will use functions, sequences and series to analyze computer science structures, and analyze the complexity of the algorithms that use them.) was assessed during **Spring 2011 semester.** In 1 section a total of 28 student results were assessed. The overall success rate (excellent or satisfactory) was 96%.

SLO#4(Students will use combinatorics and probability to model, solve and prove a variety of counting problems) was assessed during **Spring 2011 semester**. In 1 section a total of 28 student results were assessed. The overall success rate (excellent or satisfactory) was 96%.

MATH 220:

SLO #2(Students will be able to find the standard equation of the plane tangent to a given surface at a given point) was assessed during **Fall 2009 semester.** In 3 sections a total of 65

student results were assessed with 42 Excellent; 6 Satisfactory; and 17 Unsatisfactory. The overall success rate (excellent or satisfactory) was 74%.

SLO #1(Students will be able to find the unit vector tangent to a given space curve at a given point) was assessed during **Fall 2009 semester.** In 3 sections a total of 67 student results were assessed with 56 Excellent; 2 Satisfactory; and 9 Unsatisfactory. The overall success rate (excellent or satisfactory) was 87%.

SLO# (*3-D graph) was assessed during* ***Spring 2010 semester***. In 2 sections a total of 64 student results were assessed with 27 Excellent; 28 Satisfactory; and 9 Unsatisfactory. The overall success rate (excellent or satisfactory) was 86%.

SLO#2(Find the unit vector tangent to a given space curve at a given point) was assessed during **Spring 2011 semester.** In two different sections a total of 70 student results were assessed with 31 Excellent; 32 Satisfactory; and 7 Unsatisfactory. The overall success rate (excellent or satisfactory) was 90%.

SLO#4(Find the standard form of the plane tangent to given surface at a given point) was assessed during **Spring 2011 semester.** In 2 different sections a total of 70 student results were assessed with 49 Excellent; 11 Satisfactory; and 10 Unsatisfactory. The overall success rate (excellent or satisfactory) was 86%.

MATH 270:

SLO#2 (student understand the concept of subspace) was assessed during **Fall 2009 semester**. In 2 sections a total of 45 student results were assessed with 20 Excellent; 14 Satisfactory; and 11 Unsatisfactory. The overall success rate (excellent or satisfactory) was 76%.

SLO#3 (Student will *Graph the slope field and solutions of ordinary differential equations) was assessed during* ***Spring 2010 semester.*** In 1 section a total of 31 student results were assessed with 17 Excellent; 11 Satisfactory; and 3 Unsatisfactory. The overall success rate (excellent or satisfactory) was 90%.

SLO#5(Student will use Laplace transform to find particular solutions directly for both o.d.e. and systems of linear o.d.e.) was assessed during **Spring 2011 semester.** In 1 section a total of 20 student results were assessed with 9 Excellent; 5 Satisfactory; and 6 Unsatisfactory. The overall success rate (excellent or satisfactory) was 70%.

Description of changes resulting from assessment of the courses:

Math 170:

List of SLOs with and without assessment.

SLO#1: Assessed twice. Fall2009 (53% success rate) ,Spring2011(78% success rate).

SLO#2: Assessed twice. Fall2009 (60% success rate) , Spring 2011(84% success rate).

SLO#2: Scheduled to be assessed in Fall2011 for the third time.

SLO#3: No assessment yet

SLO#4: Assessed once. Fall2010 (77% success rate)

SLO#5: Assessed once. Fall 2009 (53% success rate)

SLO#6: No assessment yet.
According to Math 170 assessments No changes are planned in the SLO statement, assessment, or rubric.

Math 180:
List of SLOs with and without assessment.
SLO#1: Assessed twice. Spring2009 (53% success rate) ,Fall2009(72% success rate).
SLO#2: Assessed twice. Spring2009 (45% success rate) , Fall 2009(69% success rate).
SLO#3: Assessed once. Spring 2011 (66% success rate).
SLO#4: Assessed once. Spring2010 (72% success rate).
SLO#4: Scheduled to be assessed in Fall2011 for the second time.
SLO#5: No assessment yet.
SLO#6: Scheduled to be assessed in Fall2011
According to Math 180 assessments No changes are planned in the SLO statement, assessment, or rubric.

Math 190:
List of SLOs with and without assessment.
SLO#1: Assessed once. Spring2008 (76% success rate)
SLO#1: Scheduled to be assessed in Fall2011 for the second time.
SLO#2: Assessed once. Spring2010 (81% success rate)
SLO#3: Assessed three times. Fall 2008 (77%,85% success rates on two question),
Fall 2009(74% success rate), Spring 2011(73% success rate).
SLO#4: No assessment yet.
SLO#5: Assessed once. Fall 2010 (83% success rate)
SLO#6: No assessment yet.
According to Math 190 assessments No changes are planned in the SLO statement, assessment, or rubric.

Math 191:
List of SLOs with and without assessment.
SLO#1: Assessed once. Spring2011 (74% success rate)
SLO#2: No assessment yet.
SLO#3: No assessment yet.
SLO#4: Scheduled to be assessed in Fall2011
SLO#5: Assessed once. Spring 2010 (78% success rate)
According to Math 191 assessments No changes are planned in the SLO statement, assessment, or rubric.

Math 210:
List of SLOs with and without assessment.
SLO#1: No assessment yet.
SLO#2: Assessed twice. Spring2009 (83% success rate) ,Spring 2011(96% success rate).
SLO#3: No assessment yet.
SLO#4: Assessed once. Spring 2011 (96% success rate)
SLO#5: Assessed once. Spring 2010 (89% success rate)

According to Math 210 assessments No changes are planned in the SLO statement, assessment, or rubric.

Math 220:
List of SLOs with and without assessment.
SLO#1: Assessed once. Fall 2009 (87% success rate)
SLO#1: Scheduled to be assessed in Fall2011 for the second time.
SLO#2: Assessed twice. Fall 2009 (74% success rate) ,Spring 2011(90% success rate).
SLO#3: No assessment yet.
SLO#4: Assessed once. Spring 2011 (86% success rate)
SLO#5: No assessment yet.
According to Math 220 assessments No changes are planned in the SLO statement, assessment, or rubric.

Math 270:
List of SLOs with and without assessment.
SLO#1: No assessment yet.
SLO#2: Assessed once. Fall 2009 (76% success rate).
SLO#3: Assessed once. Spring 2010 (90% success rate
SLO#3: Scheduled to be assessed in Fall2011 for the second time.
SLO#4: No assessment yet
SLO#5: Assessed once. Spring 2011 (70% success rate)
According to Math 270 assessments No changes are planned in the SLO statement, assessment, or rubric.

APPENDIX D

CM1 SLO Assessment Collection

SLO Assessment Information Name: (teacher's name) Course: Math 170 Section xxxx	Fall 2011
Math 170 SLO-2 Students will graph trigonometric functions and their inverses.	
Test Question: (Course coordinator may provide a sample question) X	
Category	**Number of students**
Excellent (Strong understanding of concept and strong computational skill)	**x**
Satisfactory (Medium understanding of concept and medium computational skill)	**x**
Unsatisfactory (Weak understanding of concept and weak computational skill)	**x**
ANALYSIS: X	

College Math Student Survey
Fall 2011

1. Which math course are you enrolled in this semester?

- ○ Math 80 ○ Math 180 ○ Math 191 ○ Math 220
- ○ Math 170 ○ Math 190 ○ Math 210 ○ Math 270

2. What is your intended major?

- ○ Mathematics ○ Computer Science ○ Humanities
- ○ Physical Sciences ○ Engineering ○ Other
- ○ Life Sciences ○ Business/Economics

3. How many units have you completed at El Camino (not including this semester)?

- ○ Less than or equal to 15 units ○ From 31 to 45 units ○ More than 60 units
- ○ From 16 to 30 units ○ From 46 to 60 units

4. Which math courses have you completed at El Camino?

- ○ Int Algebra (M 70 or 80) ○ Precalculus (M 180) ○ Calc III (Math 220)
- ○ College Algebra (M 130) ○ Calc I (M190) ○ Linear Alg/Diff Eq (M 270)
- ○ Trig (M170) ○ Calc II (M191) ○ Discrete Math (M210)

5. Which math courses do you plan to take at El Camino?

- ○ Math 170 ○ Math 190 ○ Math 220 ○ Math 210
- ○ Math 180 ○ Math 191 ○ Math 270

6. In the past two years, were you unable to add a mathematics course because all the sections were full?

- ○ Yes
- ○ No

7. If you answered Yes to question (6), which math courses were you unable to add?

- ○ Math 80 ○ Math 180 ○ Math 191 ○ Math 220
- ○ Math 170 ○ Math 190 ○ Math 210 ○ Math 270

8. Which type of textbook do you prefer?

- ○ Hardback book
- ○ Paperback book
- ○ e-book or other online resources

9. If you took the Placement Exam, what do think about the level where you were placed?

- ○ Too low ○ Just right
- ○ Too high ○ Did not take placement test

10. Which technology or computer programs have you used in your math classes?

- ○ Mathematica ○ Graphing Calculator
- ○ MathLab ○ Other
- ○ Excel

11. What is your desired transfer college or university?

- ○ CSULB ○ USC ○ Other
- ○ CSUDH ○ CSU (other than CSULB and CSUDH)
- ○ UCLA ○ UC (other than UCLA)

12. Do you use the campus library for research or homework?

- ○ Yes
- ○ No

13. Which of the following campus resources have you used?

- ○ MESA
- ○ Math Study Center (MCS 106)
- ○ Counseling
- ○ Writing Lab
- ○ A Student Club
- ○ Instructor Office Hours

14. If you have used the Math Study Center (MCS 106), how would you describe the experience?

- ○ Very helpful
- ○ Somewhat helpful
- ○ Not helpful
- ○ Have not used

15. Which college degree is your ultimate educational goal?

- ○ Associate's
- ○ Bachelor's
- ○ Master's
- ○ Doctorate
- ○ other

Math Majors Course Outcomes: Fall 06 to Spring 11

TERM	COURSE	A	B	C	D	F	I	DR	W	Success	Retention
Fall 06	MATH-170	14%	14%	18%	7%	12%	0%	0%	36%	45.5%	63.9%
	MATH-180	20%	19%	18%	10%	8%	0%	0%	24%	58.1%	75.8%
	MATH-190	28%	17%	11%	5%	6%	1%	0%	31%	56.7%	68.6%
	MATH-191	20%	17%	16%	9%	7%	1%	0%	29%	53.6%	70.6%
	MATH-220	17%	21%	36%	2%	5%	0%	0%	20%	74.2%	80.3%
	MATH-270	46%	14%	14%	5%	8%	0%	0%	14%	73.0%	86.5%
Winter 07	MATH-170	31%	27%	16%	6%	5%	2%	0%	13%	74.0%	87.0%
Spring 07	MATH-170	12%	18%	18%	8%	8%	0%	0%	36%	47.6%	63.7%
	MATH-180	13%	18%	16%	5%	8%	0%	0%	40%	46.8%	59.6%
	MATH-190	18%	22%	19%	3%	4%	0%	0%	34%	59.1%	66.3%
	MATH-191	23%	23%	14%	3%	10%	0%	0%	27%	60.6%	73.1%
	MATH-210	52%	12%	16%	0%	0%	0%	0%	20%	80.0%	80.0%
	MATH-220	27%	16%	18%	9%	7%	0%	0%	23%	60.7%	76.8%
	MATH-270	24%	33%	4%	14%	0%	0%	0%	25%	60.8%	74.5%
Summer 07	MATH-170	19%	12%	19%	11%	15%	0%	5%	20%	49.6%	74.8%
	MATH-180	17%	23%	18%	6%	12%	0%	3%	21%	57.9%	75.8%
	MATH-190	19%	17%	15%	9%	11%	0%	4%	24%	50.9%	71.6%
	MATH-191	13%	23%	9%	13%	10%	0%	1%	30%	45.5%	68.8%
	MATH-220	25%	27%	30%	1%	4%	0%	4%	7%	82.1%	88.1%
Fall 07	MATH-170	13%	15%	20%	12%	9%	0%	4%	26%	48.4%	69.6%
	MATH-180	19%	16%	15%	7%	11%	0%	4%	27%	50.6%	69.1%
	MATH-190	18%	21%	15%	6%	8%	1%	5%	26%	54.3%	69.4%
	MATH-191	22%	18%	16%	7%	10%	1%	7%	20%	56.3%	73.7%
	MATH-220	24%	20%	17%	5%	2%	0%	13%	19%	61.6%	68.6%
	MATH-270	17%	17%	36%	3%	3%	3%	0%	22%	69.4%	77.8%
Winter 08	MATH-170	19%	22%	16%	7%	11%	1%	5%	19%	57.4%	76.2%
Spring 08	MATH-170	10%	17%	19%	7%	7%	0%	5%	35%	46.2%	60.1%
	MATH-180	12%	17%	17%	6%	9%	0%	3%	36%	46.1%	60.9%
	MATH-190	25%	19%	16%	7%	4%	0%	8%	21%	59.9%	71.2%
	MATH-191	16%	25%	14%	8%	10%	0%	4%	22%	55.7%	73.6%
	MATH-210	45%	20%	20%	0%	0%	0%	0%	15%	85.0%	85.0%
	MATH-220	26%	26%	18%	6%	3%	0%	6%	15%	70.8%	79.2%
	MATH-270	26%	24%	26%	0%	6%	2%	4%	12%	76.0%	84.0%

TERM	COURSE	A	B	C	D	F	I	DR	W	Success	Retention
	MATH-170	25%	24%	24%	8%	4%	0%	1%	15%	72.2%	84.1%
	MATH-180	12%	17%	22%	10%	15%	0%	6%	18%	51.0%	75.5%
Summer 08	MATH-190	19%	13%	18%	12%	8%	1%	7%	22%	50.7%	71.3%
	MATH-191	22%	20%	12%	7%	13%	0%	6%	21%	53.5%	73.3%
	MATH-220	22%	20%	20%	11%	11%	0%	3%	14%	61.5%	83.1%
	MATH-170	15%	14%	15%	9%	16%	0%	5%	26%	43.4%	69.0%
	MATH-180	21%	20%	17%	7%	8%	0%	3%	24%	58.2%	73.2%
Fall 08	MATH-190	17%	22%	20%	7%	8%	0%	3%	22%	59.0%	74.7%
	MATH-191	13%	20%	18%	5%	15%	0%	5%	24%	51.2%	71.2%
	MATH-220	21%	36%	14%	2%	3%	0%	13%	11%	70.1%	75.9%
	MATH-270	51%	18%	13%	0%	0%	0%	10%	8%	82.1%	82.1%
Winter 09	MATH-170	30%	31%	20%	5%	5%	0%	2%	8%	81.3%	90.6%
	MATH-170	16%	22%	20%	7%	14%	0%	3%	18%	57.7%	79.2%
	MATH-180	19%	15%	16%	8%	12%	0%	2%	28%	50.5%	70.5%
	MATH-190	18%	18%	15%	9%	10%	0%	4%	26%	51.4%	69.7%
Spring 09	MATH-191	16%	24%	19%	6%	10%	1%	3%	21%	58.3%	75.5%
	MATH-210	41%	32%	6%	3%	12%	0%	0%	6%	79.4%	94.1%
	MATH-220	23%	17%	14%	10%	6%	0%	4%	25%	55.1%	71.0%
	MATH-270	23%	28%	23%	0%	5%	0%	0%	21%	73.7%	78.9%
	MATH-170	18%	24%	28%	5%	14%	0%	1%	9%	70.4%	89.3%
	MATH-180	18%	14%	17%	11%	10%	0%	6%	24%	48.7%	69.7%
Summer 09	MATH-190	14%	17%	20%	12%	12%	0%	7%	18%	51.0%	74.8%
	MATH-191	8%	8%	20%	6%	13%	0%	18%	28%	36.7%	55.0%
	MATH-220	29%	15%	23%	5%	13%	0%	12%	3%	67.9%	85.9%
	MATH-170	13%	19%	17%	4%	10%	0%	9%	28%	48.8%	62.7%
	MATH-180	14%	18%	18%	11%	10%	0%	4%	25%	49.5%	70.7%
Fall 09	MATH-190	22%	19%	14%	5%	10%	1%	5%	24%	55.7%	71.2%
	MATH-191	20%	19%	20%	7%	8%	0%	6%	21%	58.8%	73.9%
	MATH-220	29%	21%	28%	3%	0%	0%	8%	11%	77.6%	80.6%
	MATH-270	25%	37%	16%	0%	0%	2%	5%	16%	77.2%	78.9%
Winter 10	MATH-170	23%	18%	20%	14%	3%	0%	3%	20%	60.0%	76.7%
	MATH-170	12%	20%	19%	12%	10%	0%	3%	24%	50.6%	73.1%
	MATH-180	16%	19%	22%	9%	10%	0%	2%	23%	56.5%	75.3%
	MATH-190	22%	20%	17%	9%	5%	0%	2%	25%	59.2%	73.4%
Spring 10	MATH-191	20%	18%	14%	8%	8%	0%	3%	30%	51.2%	66.8%
	MATH-210	21%	18%	13%	3%	8%	0%	0%	37%	52.6%	63.2%
	MATH-220	18%	24%	24%	4%	8%	0%	4%	18%	65.8%	77.6%
	MATH-270	22%	29%	22%	3%	4%	0%	7%	12%	73.5%	80.9%

TERM	COURSE	A	B	C	D	F	I	DR	W	Success	Retention
Summer 10	MATH-170	40%	31%	18%	2%	3%	0%	0%	5%	90.1%	95.0%
	MATH-180	11%	11%	21%	8%	9%	0%	7%	33%	42.3%	59.3%
	MATH-190	18%	20%	20%	9%	7%	0%	9%	18%	57.4%	73.0%
	MATH-191	15%	17%	17%	11%	12%	0%	10%	18%	47.8%	71.3%
	MATH-220	35%	29%	6%	4%	10%	0%	6%	8%	70.8%	85.4%
Fall 10	MATH-170	11%	18%	18%	8%	12%	0%	3%	30%	47.1%	66.8%
	MATH-180	16%	21%	22%	11%	9%	1%	2%	18%	59.4%	80.0%
	MATH-190	16%	18%	18%	6%	7%	0%	4%	31%	52.7%	65.2%
	MATH-191	22%	27%	14%	6%	7%	0%	6%	19%	62.2%	75.1%
	MATH-220	29%	18%	22%	8%	2%	0%	6%	14%	69.6%	79.5%
	MATH-270	28%	33%	25%	5%	5%	0%	3%	2%	85.2%	95.1%
Winter 11	MATH-170	22%	32%	21%	6%	5%	0%	1%	13%	75.2%	86.4%
Spring 11	MATH-170	12%	16%	22%	8%	13%	1%	4%	25%	48.9%	71.2%
	MATH-180	17%	22%	21%	8%	7%	0%	4%	21%	59.6%	74.2%
	MATH-190	18%	21%	18%	7%	9%	0%	4%	23%	57.3%	73.2%
	MATH-191	25%	15%	18%	5%	8%	0%	3%	25%	58.5%	72.2%
	MATH-210	25%	42%	8%	0%	3%	0%	8%	14%	75.0%	77.8%
	MATH-220	25%	32%	19%	13%	3%	0%	3%	6%	75.9%	91.1%
	MATH-270	35%	30%	21%	2%	0%	0%	0%	13%	85.7%	87.3%

Math Majors Course Outcomes: Fall 06 to Spring 11

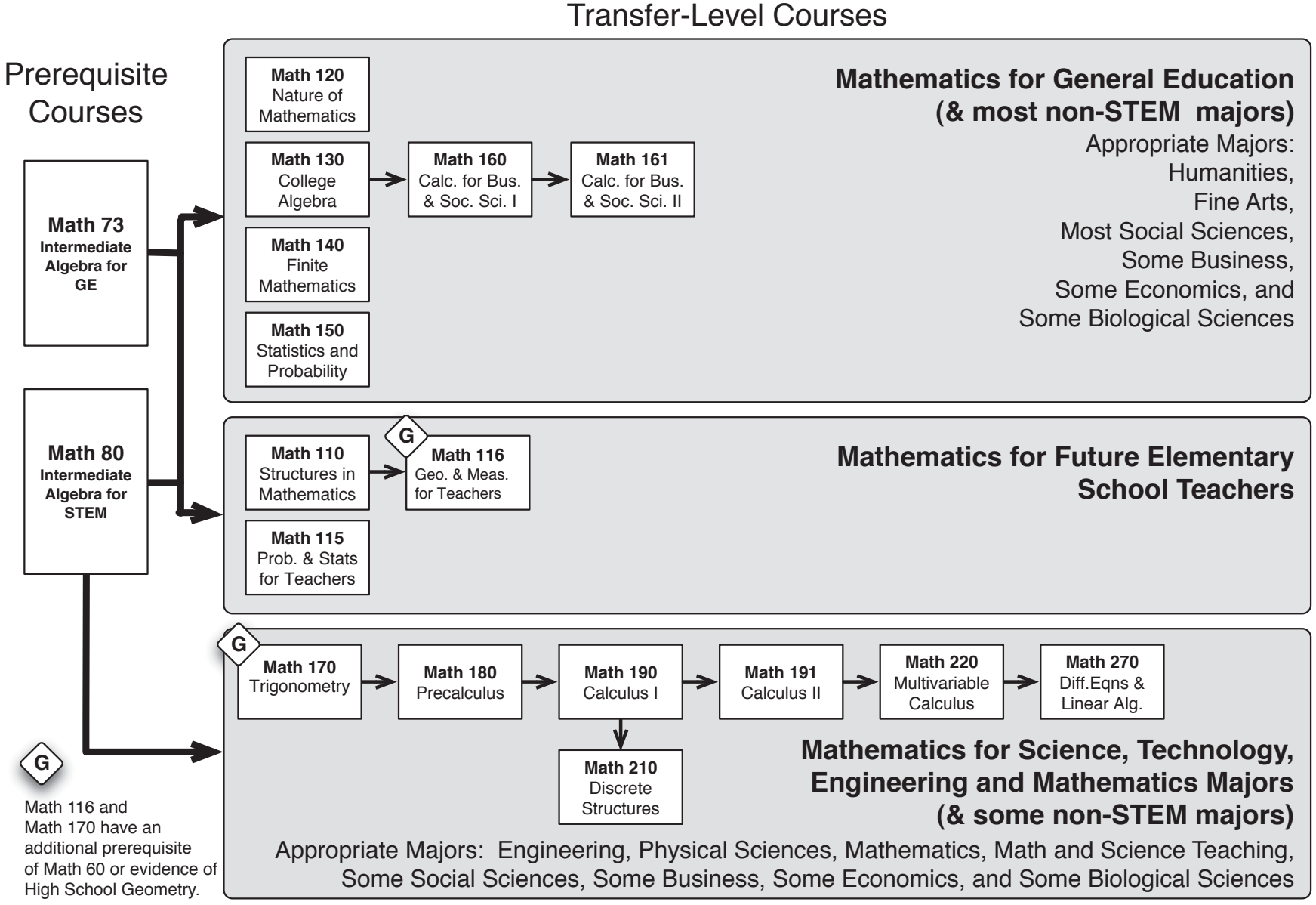
TERM	COURSE	A	B	C	D	F	I	DR	W	Success	Retention
Fall 06	MATH-170	35	33	43	16	29	0	0	88	45.5%	63.9%
	MATH-180	54	51	49	26	21	0	0	64	58.1%	75.8%
	MATH-190	83	50	33	14	19	2	0	92	56.7%	68.6%
	MATH-191	31	26	25	14	11	1	0	45	53.6%	70.6%
	MATH-220	11	14	24	1	3	0	0	13	74.2%	80.3%
	MATH-270	17	5	5	2	3	0	0	5	73.0%	86.5%
Winter 07	MATH-170	31	27	16	6	5	2	0	13	74.0%	87.0%
Spring 07	MATH-170	29	44	45	20	20	0	0	90	47.6%	63.7%
	MATH-180	29	39	34	11	17	0	0	88	46.8%	59.6%
	MATH-190	48	59	49	9	10	0	0	89	59.1%	66.3%
	MATH-191	41	40	25	5	17	0	0	47	60.6%	73.1%
	MATH-210	13	3	4	0	0	0	0	5	80.0%	80.0%
	MATH-220	15	9	10	5	4	0	0	13	60.7%	76.8%
	MATH-270	12	17	2	7	0	0	0	13	60.8%	74.5%
Summer 07	MATH-170	23	15	23	13	18	0	6	25	49.6%	74.8%
	MATH-180	16	22	17	6	11	0	3	20	57.9%	75.8%
	MATH-190	22	20	17	11	13	0	5	28	50.9%	71.6%
	MATH-191	10	18	7	10	8	0	1	23	45.5%	68.8%
	MATH-220	17	18	20	1	3	0	3	5	82.1%	88.1%
Fall 07	MATH-170	38	43	59	34	27	0	13	75	48.4%	69.6%
	MATH-180	47	39	37	18	27	0	9	66	50.6%	69.1%
	MATH-190	49	55	40	17	20	3	12	69	54.3%	69.4%
	MATH-191	37	30	27	11	16	2	11	33	56.3%	73.7%
	MATH-220	21	17	15	4	2	0	11	16	61.6%	68.6%
	MATH-270	6	6	13	1	1	1	0	8	69.4%	77.8%
Winter 08	MATH-170	23	27	20	8	14	1	6	23	57.4%	76.2%
Spring 08	MATH-170	30	48	54	20	19	1	14	100	46.2%	60.1%
	MATH-180	31	43	44	15	23	0	7	93	46.1%	60.9%
	MATH-190	55	43	35	16	8	1	17	47	59.9%	71.2%
	MATH-191	33	50	29	16	20	0	9	44	55.7%	73.6%
	MATH-210	9	4	4	0	0	0	0	3	85.0%	85.0%
	MATH-220	19	19	13	4	2	0	4	11	70.8%	79.2%
	MATH-270	13	12	13	0	3	1	2	6	76.0%	84.0%

TERM	COURSE	A	B	C	D	F	I	DR	W	Success	Retention
	MATH-170	37	36	36	12	6	0	1	23	72.2%	84.1%
	MATH-180	17	25	33	14	22	0	9	27	51.0%	75.5%
Summer 08	MATH-190	26	18	25	16	11	1	9	30	50.7%	71.3%
	MATH-191	22	20	12	7	13	0	6	21	53.5%	73.3%
	MATH-220	14	13	13	7	7	0	2	9	61.5%	83.1%
	MATH-170	50	47	50	31	55	1	18	87	43.4%	69.0%
	MATH-180	69	65	57	23	25	1	9	79	58.2%	73.2%
Fall 08	MATH-190	45	57	52	19	22	0	9	57	59.0%	74.7%
	MATH-191	22	34	31	8	26	0	9	40	51.2%	71.2%
	MATH-220	18	31	12	2	3	0	11	10	70.1%	75.9%
	MATH-270	20	7	5	0	0	0	4	3	82.1%	82.1%
Winter 09	MATH-170	38	40	26	6	6	0	2	10	81.3%	90.6%
	MATH-170	47	66	59	21	43	0	9	53	57.7%	79.2%
	MATH-180	61	48	52	25	39	0	6	88	50.5%	70.5%
	MATH-190	52	50	44	25	27	0	11	75	51.4%	69.7%
Spring 09	MATH-191	34	51	41	14	21	2	7	46	58.3%	75.5%
	MATH-210	14	11	2	1	4	0	0	2	79.4%	94.1%
	MATH-220	16	12	10	7	4	0	3	17	55.1%	71.0%
	MATH-270	13	16	13	0	3	0	0	12	73.7%	78.9%
	MATH-170	31	40	48	9	23	0	2	16	70.4%	89.3%
	MATH-180	27	21	26	17	15	0	9	37	48.7%	69.7%
Summer 09	MATH-190	21	27	31	19	18	0	11	28	51.0%	74.8%
	MATH-191	10	10	24	7	15	0	21	33	36.7%	55.0%
	MATH-220	23	12	18	4	10	0	9	2	67.9%	85.9%
	MATH-170	44	62	55	14	32	0	29	94	48.8%	62.7%
	MATH-180	51	66	69	40	39	1	16	94	49.5%	70.7%
Fall 09	MATH-190	68	60	44	14	32	2	15	74	55.7%	71.2%
	MATH-191	40	37	40	14	16	0	11	41	58.8%	73.9%
	MATH-220	28	21	27	3	0	0	8	11	77.6%	80.6%
	MATH-270	14	21	9	0	0	1	3	9	77.2%	78.9%
Winter 10	MATH-170	27	21	24	17	3	0	4	24	60.0%	76.7%
	MATH-170	29	49	48	29	26	1	7	60	50.6%	73.1%
	MATH-180	57	67	77	31	35	1	7	81	56.5%	75.3%
	MATH-190	69	63	55	29	16	0	6	78	59.2%	73.4%
Spring 10	MATH-191	43	38	30	17	17	0	7	65	51.2%	66.8%
	MATH-210	8	7	5	1	3	0	0	14	52.6%	63.2%
	MATH-220	14	18	18	3	6	0	3	14	65.8%	77.6%
	MATH-270	15	20	15	2	3	0	5	8	73.5%	80.9%

TERM	COURSE	A	B	C	D	F	I	DR	W	Success	Retention
	MATH-170	57	44	26	3	4	0	0	7	90.1%	95.0%
	MATH-180	13	13	26	10	11	0	9	41	42.3%	59.3%
Summer 10	MATH-190	22	24	24	11	8	0	11	22	57.4%	73.0%
	MATH-191	17	19	19	13	14	0	12	21	47.8%	71.3%
	MATH-220	17	14	3	2	5	0	3	4	70.8%	85.4%
	MATH-170	35	55	56	24	37	0	9	94	47.1%	66.8%
	MATH-180	58	77	79	38	33	3	8	64	59.4%	80.0%
Fall 10	MATH-190	52	57	59	18	22	0	13	98	52.7%	65.2%
	MATH-191	47	58	30	12	15	1	12	42	62.2%	75.1%
	MATH-220	33	20	25	9	2	0	7	16	69.6%	79.5%
	MATH-270	17	20	15	3	3	0	2	1	85.2%	95.1%
Winter 11	MATH-170	28	40	26	8	6	0	1	16	75.2%	86.4%
	MATH-170	31	41	57	22	35	2	10	66	48.9%	71.2%
	MATH-180	64	83	82	29	26	1	17	82	59.6%	74.2%
	MATH-190	64	75	66	26	31	0	14	82	57.3%	73.2%
Spring 11	MATH-191	62	38	45	13	20	1	7	62	58.5%	72.2%
	MATH-210	9	15	3	0	1	0	3	5	75.0%	77.8%
	MATH-220	20	25	15	10	2	0	2	5	75.9%	91.1%
	MATH-270	22	19	13	1	0	0	0	8	85.7%	87.3%

El Camino College

Transfer-Level Mathematics



Demographic and Enrollment Characteristics
Calculus Track
Fall 2007 to Fall 2010

										Fall 2010		2010 Census	
Characteristic	**Category**	**Fall 2007**		**Fall 2008**		**Fall 2009**		**Fall 2010**		**ECC**		**ECC District**	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
All Enrolled	Total	1,084	100.0%	1,222	100.0%	1,361	100.0%	1,375	100.0%	*24,775*	100.0%	563,522	
Gender	Female	331	30.5%	381	31.2%	433	31.8%	438	31.9%	12,776	51.6%	287,661	51.0%
	Male	753	69.5%	840	68.7%	927	68.1%	936	68.1%	11,980	48.4%	275,861	49.0%
	Unknown	0	0.0%	1	0.1%	1	0.1%	1	0.1%	19	0.1%	0	0.0%
Ethnicity	African-American	63	5.8%	82	6.7%	84	6.2%	76	5.5%	4,241	17.1%	86,551	15.4%
	Amer. Ind. or Alaskan	3	0.3%	1	0.1%	3	0.2%	4	0.3%	82	0.3%	1,152	0.2%
	Asian	397	36.6%	440	36.0%	466	34.2%	489	35.6%	4,235	17.1%	76,611	13.6%
	Latino	282	26.0%	311	25.5%	370	27.2%	407	29.6%	9,279	37.5%	193,092	34.3%
	Pacific Islander	11	1.0%	5	0.4%	7	0.5%	10	0.7%	177	0.7%	2,724	0.5%
	White	198	18.3%	238	19.5%	261	19.2%	258	18.8%	4,641	18.7%	185,138	32.9%
	Unknown or Decline	130	12.0%	145	11.9%	144	10.6%	92	6.7%	1,432	5.8%	2,017	0.4%
Age/Age Group	Under 17	20	1.8%	18	1.5%	11	0.8%	15	1.1%	186	0.8%	136,146	24.2%
	17	52	4.8%	58	4.7%	63	4.6%	50	3.6%	553	2.2%		
	18	175	16.1%	167	13.7%	221	16.2%	203	14.8%	2,923	11.8%	14,335	2.5%
	19	232	21.4%	285	23.3%	268	19.7%	321	23.3%	3,532	14.3%		
	20	169	15.6%	207	16.9%	227	16.7%	219	15.9%	2,982	12.0%	6,745	1.2%
	21	109	10.1%	103	8.4%	146	10.7%	125	9.1%	2,129	8.6%	6,668	1.2%
	22	67	6.2%	78	6.4%	95	7.0%	104	7.6%	1,649	6.7%	22,175	3.9%
	23	60	5.5%	63	5.2%	60	4.4%	58	4.2%	1,291	5.2%		
	24	43	4.0%	58	4.7%	51	3.7%	49	3.6%	1,023	4.1%		
	25-29	86	7.9%	101	8.3%	121	8.9%	137	10.0%	3,121	12.6%	41,894	7.4%
	30-39	44	4.1%	57	4.7%	65	4.8%	66	4.8%	2,592	10.5%	83,949	14.9%
	40-49	13	1.2%	21	1.7%	19	1.4%	20	1.5%	1,509	6.1%	89,694	15.9%
	50-64	11	1.0%	5	0.4%	13	1.0%	7	0.5%	1,080	4.4%	101,912	18.1%
	65+	3	0.3%	1	0.1%	1	0.1%	1	0.1%	204	0.8%	60,004	10.6%
Class Load	Full-time	691	63.7%	787	64.4%	889	65.3%	920	66.9%	7,688	31.0%		
	Part-time	391	36.1%	435	35.6%	472	34.7%	455	33.1%	16,271	65.7%		
	Not enrolled or N/A	2	0.2%	0	0.0%	0	0.0%	0	0.0%	816	3.3%		

								Fall 2010		2010 Census			
Characteristic	**Category**	**Fall 2007**		**Fall 2008**		**Fall 2009**		**Fall 2010**		**ECC**		**ECC District**	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Time of Classes*	Daytime	987	91.1%	1,109	90.8%	1,269	93.2%	1,275	92.7%	19,023	76.8%		
	Evening	97	8.9%	113	9.2%	92	6.8%	100	7.3%	4,485	18.1%		
	Unknown	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1,267	5.1%		
Academic Level	College degree	45	4.2%	82	6.7%	91	6.7%	100	7.3%	3,288	13.3%		
	HS Graduate	930	85.8%	1,079	88.3%	1,199	88.1%	1,219	88.7%	20,232	81.7%		
	Not a HS Grad	8	0.7%	12	1.0%	14	1.0%	15	1.1%	443	1.8%		
	K-12 Special Admit	31	2.9%	28	2.3%	27	2.0%	22	1.6%	346	1.4%		
	Unknown	70	6.5%	21	1.7%	30	2.2%	19	1.4%	466	1.9%		
Educational Goal	Intend to Transfer	503	46.4%	539	44.1%	585	43.0%	566	41.2%	7,513	30.3%		
	Degree/Certif. Only	7	0.6%	7	0.6%	7	0.5%	8	0.6%	1,020	4.1%		
	Retrain/recertif.	20	1.8%	18	1.5%	18	1.3%	16	1.2%	1,387	5.6%		
	Basic Skills/GED	46	4.2%	62	5.1%	62	4.6%	88	6.4%	1,180	4.8%		
	Enrichment	46	4.2%	80	6.5%	80	5.9%	75	5.5%	1,282	5.2%		
	Undecided	272	25.1%	281	23.0%	281	20.6%	241	17.5%	4,675	18.9%		
	Unknown	190	17.5%	235	19.2%	235	17.3%	381	27.7%	7,718	31.2%		
Additional characteristics available upon request.													

Course Grade Distribution and Success/Retention Rates
Fall 2007 to Fall 2010
Calculus Track

Fall 2007

Course	A	B	C	CR	D	F	I	NC	DR	W	Total Grades	Success Rate	Retention Rate
MATH-170	38	43	59	0	34	27	0	0	13	75	289		
	13.1%	14.9%	20.4%	0.0%	11.8%	9.3%	0.0%	0.0%	4.5%	26.0%		48.4%	69.6%
MATH-180	47	39	37	0	18	27	0	0	9	66	243		
	19.3%	16.0%	15.2%	0.0%	7.4%	11.1%	0.0%	0.0%	3.7%	27.2%		50.6%	69.1%
MATH-190	49	55	40	0	17	20	3	0	12	69	265		
	18.5%	20.8%	15.1%	0.0%	6.4%	7.5%	1.1%	0.0%	4.5%	26.0%		54.3%	69.4%
MATH-191	37	30	27	0	11	16	2	0	11	33	167		
	22.2%	18.0%	16.2%	0.0%	6.6%	9.6%	1.2%	0.0%	6.6%	19.8%		56.3%	73.7%
MATH-220	21	17	15	0	4	2	0	0	11	16	86		
	24.4%	19.8%	17.4%	0.0%	4.7%	2.3%	0.0%	0.0%	12.8%	18.6%		61.6%	68.6%
MATH-270	6	6	13	0	1	1	1	0	0	8	36		
	16.7%	16.7%	36.1%	0.0%	2.8%	2.8%	2.8%	0.0%	0.0%	22.2%		69.4%	77.8%
Course Totals	198	190	191	0	85	93	6	0	56	267	1,086		
	18.2%	17.5%	17.6%	0.0%	7.8%	8.6%	0.6%	0.0%	5.2%	24.6%		**53.3%**	**70.3%**
Division Total/Avg	1,201	1,407	1,675	0	735	1,069	21	0	367	2,146	8,621		
	13.9%	16.3%	19.4%	0.0%	8.5%	12.4%	0.2%	0.0%	4.3%	24.9%		**49.7%**	**70.9%**
College Total/Avg	16,247	11,674	8,358	4,788	2,743	5,035	360	1,322	2,566	12,270	65,363		
	24.9%	17.9%	12.8%	7.3%	4.2%	7.7%	0.6%	2.0%	3.9%	18.8%		**62.8%**	**77.3%**

Fall 2008

Course	A	B	C	CR	D	F	I	NC	DR	W	Total Grades	Success Rate	Retention Rate
MATH-170	50	47	50	0	31	55	1	0	18	87	339		
	14.7%	13.9%	14.7%	0.0%	9.1%	16.2%	0.3%	0.0%	5.3%	25.7%		43.4%	69.0%
MATH-180	69	65	57	0	23	25	1	0	9	79	328		
	21.0%	19.8%	17.4%	0.0%	7.0%	7.6%	0.3%	0.0%	2.7%	24.1%		58.2%	73.2%
MATH-190	45	57	52	0	19	22	0	0	9	57	261		
	17.2%	21.8%	19.9%	0.0%	7.3%	8.4%	0.0%	0.0%	3.4%	21.8%		59.0%	74.7%
MATH-191	22	34	31	0	8	26	0	0	9	40	170		
	12.9%	20.0%	18.2%	0.0%	4.7%	15.3%	0.0%	0.0%	5.3%	23.5%		51.2%	71.2%

MATH-220	18	31	12	0	2	3	0	0	11	10	87		
	20.7%	35.6%	13.8%	0.0%	2.3%	3.4%	0.0%	0.0%	12.6%	11.5%		70.1%	75.9%
MATH-270	20	7	5	0	0	0	0	0	4	3	39		
	51.3%	17.9%	12.8%	0.0%	0.0%	0.0%	0.0%	0.0%	10.3%	7.7%		82.1%	82.1%
Course Totals	224	241	207	0	83	131	2	0	60	276	1,224		
	18.3%	19.7%	16.9%	0.0%	6.8%	10.7%	0.2%	0.0%	4.9%	22.5%		**54.9%**	**72.5%**
Division Total/Avg	1,268	1,596	1,859	0	801	1,390	16	0	475	2,007	9,412		
	13.5%	17.0%	19.8%	0.0%	8.5%	14.8%	0.2%	0.0%	5.0%	21.3%		**50.2%**	**73.6%**
College Total/Avg	17,999	12,636	9,270	5,700	3,168	6,825	456	1,814	3,058	10,672	71,598		
	25.1%	17.6%	12.9%	8.0%	4.4%	9.5%	0.6%	2.5%	4.3%	14.9%		**63.7%**	**80.8%**

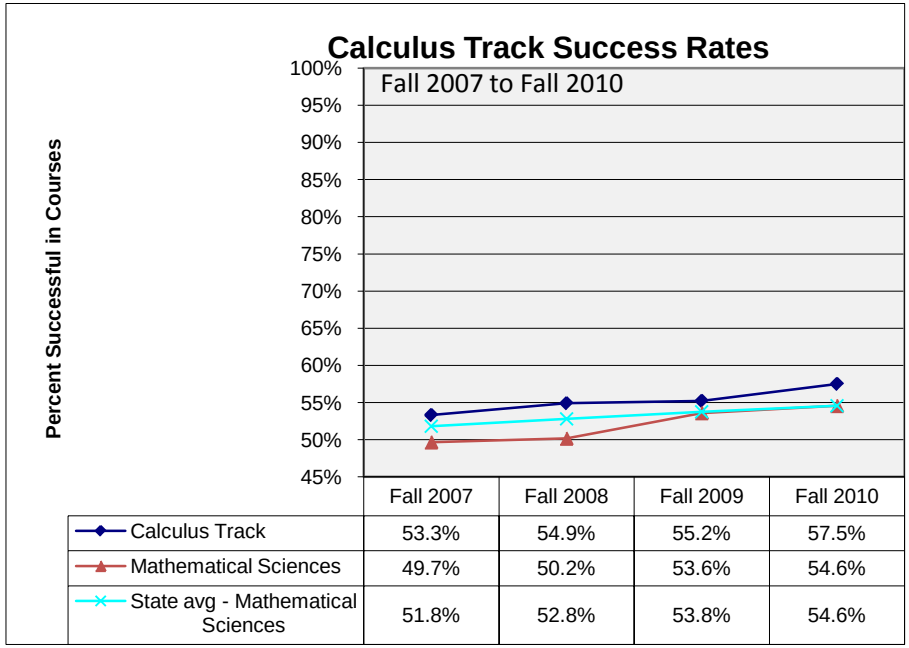
Fall 2009

Course	A	B	C	P	D	F	I	NP	DR	W	Total Grades	Success Rate	Retention Rate
MATH-170	44	62	55	0	14	32	0	0	29	94	330		
	13.3%	18.8%	16.7%	0.0%	4.2%	9.7%	0.0%	0.0%	8.8%	28.5%		48.8%	62.7%
MATH-180	51	66	69	0	40	39	1	0	16	94	376		
	13.6%	17.6%	18.4%	0.0%	10.6%	10.4%	0.3%	0.0%	4.3%	25.0%		49.5%	70.7%
MATH-190	68	60	44	0	14	32	2	0	15	74	309		
	22.0%	19.4%	14.2%	0.0%	4.5%	10.4%	0.6%	0.0%	4.9%	23.9%		55.7%	71.2%
MATH-191	40	37	40	0	14	16	0	0	11	41	199		
	20.1%	18.6%	20.1%	0.0%	7.0%	8.0%	0.0%	0.0%	5.5%	20.6%		58.8%	73.9%
MATH-220	28	21	27	0	3	0	0	0	8	11	98		
	28.6%	21.4%	27.6%	0.0%	3.1%	0.0%	0.0%	0.0%	8.2%	11.2%		77.6%	80.6%
MATH-270	14	21	9	0	0	0	1	0	3	9	57		
	24.6%	36.8%	15.8%	0.0%	0.0%	0.0%	1.8%	0.0%	5.3%	15.8%		77.2%	78.9%
Course Totals	245	267	244	0	85	119	4	0	82	323	1,369		
	17.9%	19.5%	17.8%	0.0%	6.2%	8.7%	0.3%	0.0%	6.0%	23.6%		**55.2%**	**70.4%**
Division Total/Avg	1,376	1,649	2,015	0	786	1,121	18	0	451	1,989	9,405		
	14.6%	17.5%	21.4%	0.0%	8.4%	11.9%	0.2%	0.0%	4.8%	21.1%		**53.6%**	**74.1%**
College Total/Avg	18,868	13,261	9,888	5,559	3,193	5,916	368	1,548	3,044	9,939	71,584		
	26.4%	18.5%	13.8%	7.8%	4.5%	8.3%	0.5%	2.2%	4.3%	13.9%		**66.5%**	**81.9%**

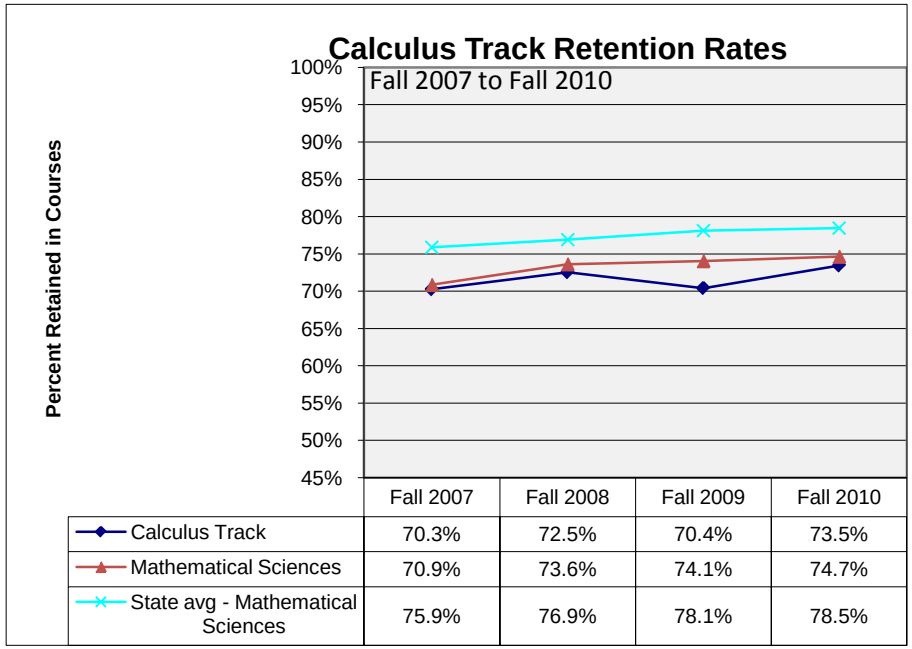
Fall 2010

Course	A	B	C	P	D	F	I	NP	DR	W	Total Grades	Success Rate	Retention Rate
MATH-170	35	55	56	0	24	37	0	0	9	94	310		
	11.3%	17.7%	18.1%	0.0%	7.7%	11.9%	0.0%	0.0%	2.9%	30.3%		47.1%	66.8%

MATH-180	58	77	79	0	38	33	3	0	8	64	360		
	16.1%	21.4%	21.9%	0.0%	10.6%	9.2%	0.8%	0.0%	2.2%	17.8%		59.4%	80.0%
MATH-190	52	57	59	0	18	22	0	0	13	98	319		
	16.3%	17.9%	18.5%	0.0%	5.6%	6.9%	0.0%	0.0%	4.1%	30.7%		52.7%	65.2%
MATH-191	47	58	30	0	12	15	1	0	12	42	217		
	21.7%	26.7%	13.8%	0.0%	5.5%	6.9%	0.5%	0.0%	5.5%	19.4%		62.2%	75.1%
MATH-220	33	20	25	0	9	2	0	0	7	16	112		
	29.5%	17.9%	22.3%	0.0%	8.0%	1.8%	0.0%	0.0%	6.3%	14.3%		69.6%	79.5%
MATH-270	17	20	15	0	3	3	0	0	2	1	61		
	27.9%	32.8%	24.6%	0.0%	4.9%	4.9%	0.0%	0.0%	3.3%	1.6%		85.2%	95.1%
Course Totals	242	287	264	0	104	112	4	0	51	315	1,379		
	17.5%	20.8%	19.1%	0.0%	7.5%	8.1%	0.3%	0.0%	3.7%	22.8%		**57.5%**	**73.5%**
Division Total/Avg	1,231	1,703	1,908	0	745	1,022	17	0	376	1,874	8,876		
	13.9%	19.2%	21.5%	0.0%	8.4%	11.5%	0.2%	0.0%	4.2%	21.1%		**54.6%**	**74.7%**
College Total/Avg	15,859	12,145	8,816	4,464	2,772	4,452	427	1,232	2,375	9,029	61,571		
	25.8%	19.7%	14.3%	7.3%	4.5%	7.2%	0.7%	2.0%	3.9%	14.7%		**67.1%**	**81.5%**



	Fall 2007	Fall 2008	Fall 2009	Fall 2010
Calculus Track	53.3%	54.9%	55.2%	57.5%
Mathematical Sciences	49.7%	50.2%	53.6%	54.6%
State avg - Mathematical Sciences	51.8%	52.8%	53.8%	54.6%



	Fall 2007	Fall 2008	Fall 2009	Fall 2010
Calculus Track	70.3%	72.5%	70.4%	73.5%
Mathematical Sciences	70.9%	73.6%	74.1%	74.7%
State avg - Mathematical Sciences	75.9%	76.9%	78.1%	78.5%