

Mathematics Department

Annual Planning for Academic Year 2015-2016

Planning Year 2014

Description Of Department/Unit

Mission/Connection to College Mission

The Mathematics Department at Cerro Coso Community College plays an important role in preparing students to achieve their educational goals. We offer math courses from the remedial level to transfer level as well as an online math degree. Our curriculum supports the mathematical needs of other disciplines and programs. We help our students develop logical reasoning and problem solving skills which form a foundation for their careers and future study. The Mathematics Department at Cerro Coso Community College offers classes which improve basic skills and support the requirement for the AA and AS degrees, vocational/technical programs, and transfer to the university. We have entered into agreements and developed equivalencies with the California State Universities (CSU) and University of California (UC) systems. When our students transfer to the CSU or UC system, credits they earn in the mathematics department are transferable. This is also an indication that these transfer students from Cerro Coso Community College will be successful in completing higher degrees. The Mathematics Department offers courses at the Indian Wells Valley (IWV), Kern River Valley (KRV), Eastern Sierra College Center (ESCC), South Kern (SK), and Tehachapi sites as well as online. Three full-time faculty serve the IWV campus. One full-time faculty serves the KRV and Tehachapi campuses, and one full-time faculty serves the ESCC campus. Courses offered at SK are taught by adjunct faculty.

Student Equity

Student Equity

There were several noticeable gaps in remedial math progress with the most noticeable gap existing in the demographic of ethnicity. African American and American Indian had Proportionality Indices in the combined cohorts of 0.57 and 0.74 respectively. In regards to gender, females scored slightly above the cohort group while males scored lower than the cohort group with an index of 0.89. So there does appear to be a gender gap in the remedial math sequence. However, the most noticeable gaps exist for age 40 and older students. In this category, retention in Mathematics was about 7 percent less than the collegewide retention rate. While the collegewide success rate was 71% for age 40 and older students, the math success rate was only 58% for this same age group. The Math Department will address this apparent age related performance gap and begin discussions about how improvements in retention and success might be increased for 40 and older as well as students who have been away from academic math for some time.

Review And Planning

Progress Made on Program Review

Math and Science Liberal Arts

Year of Last Program Review:

Progress in the last year on Three-Year Strategies:

Communicated with the Science Department about the Long Term Schedule of math courses pertinent to the Liberal Arts Degree

Specific math course Student Learning Outcomes have been aligned with the Math and Science Liberal Arts Degree Program Learning Outcomes

Progress in the last year on Six-Year Strategies:

Progress Made on Outcome Assessment

Math 20 -

In this Basic Skills Math Course, all of the learning outcomes exceeded the 70% target with the exception of SLO number 5 involving the conversion between fractions, decimals and percents and employing this skill to real-life examples. The assessment done in the previous year had three outcomes that were slightly below the 70% target. In 2013 these outcomes were finding sums, differences, products and quotients of fractions and mixed numbers which missed the target by 2%, solving problems involving addition, subtraction, multiplication, and division of decimals missing the the target by 1% and lastly, converting between fractions, decimals, and percents which scored 3% below the target. For spring 2014, this last outcome as mentioned above, outcome 5, missed the target by about 6% which is dramatically lower than the 3% gap in 2013. It is apparent that some meaningful practical applications of converting between fractions, decimals and percents should be integrated into the lessons for this outcome by all instructors of this course.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

Math 20 SLO # 5, 63.6% / 6.4%

Analysis and Plan:

Math 20 SLO 5 - Spend more class time demonstrating conversions between fractions, decimals and percents. Instructors will include real-life examples that employ this skill in class presentations.

Math 40 -

All on ground sections of PreAlgebra were assessed and every outcome contained more than 70% of the students successfully completing the outcome. In addition, this was the first year in which learning and self- efficacy skills were formally assessed.

Last year there were two outcomes that scored below the 70% target. These were the outcomes that students employ basic graphing techniques and that they add, subtract, and multiply polynomials and evaluate algebraic expressions. By implementing some of the strategies discussed among department members in 2013/14, the success rate for these outcomes in spring 2014 has climbed to 74.5% for the outcome of operations with polynomials. Likewise, the success rate for employing basic graphing techniques was 75.9% for spring 2014.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

No SLO gaps

Analysis and Plan:

There is no plan for improvement needed at this time.

Math C141 -

The outcome "recognize the equations of exponential functions and logarithmic functions, describe their graphs and use their properties algebraically and via calculator methods" scored quite low but this is due to the fact that no partial credit was awarded. In 2013, this outcome missed the target as well but by only 1%.

There was some improvement from the previous assessment in the first two outcomes. In 2013, the outcomes of being able to use function notation, perform function evaluation, and apply composition of functions and being able to demonstrate how to find the domain of a function and the inverse of a one-to-one function missed the target by 2% and 1% respectively. One instructor attributes the success in spring 2014 of this outcome to class handouts where students work the problems out on paper under the guidance of the instructor instead of just watching.

However, due in part to no awarding of partial credit, the outcomes of being able to apply multiple approaches to problem solving and being able to perform basic operations with matrices and determinants scored under the target in the spring of 2014 at 52% and 65% respectively. Problems such as these beg to have partial credit awarded as some students when solving a word problem were able to generate and solve the equation correctly but a success was not counted due to the fact that they did not state the answer to the original question. Similarly with determinants and matrix operations, which involve a tremendous number of calculations, students who made even one computational error did not have their results recorded as a success.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

SLO # 5 - 57.8 % / 12.2 %

Analysis and Plan:

SLO # 5 - Allocate more class time for practice with graphing. Also, in order to count each student as successful in this outcome, it was required that the student complete a multi-step problem perfectly. So even though the student may have been able to complete more than 70% of the problem correctly, if ALL steps were not correct, it was not counted as a success. In subsequent assessments, the department may want to consider the awarding of partial credit as a means of measuring this skill.

Math C141 - SLO # 7 Perform basic operations with matrices and determinants; solve systems of equations by multiple methods.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

SLO # 7 - 65.0% / 5.0 %

Analysis and Plan:

SLO # 7 Again, there should be some room for partial credit in evaluating this skill, perhaps in the form of a rubric instead of an all or nothing approach as was done. With this current assessment, even one computational error eliminated the student as being counted as successful in this outcome and working with matrices and determinants does involve a large number of successive computations.

Math C141 - SLO # 8 Find limit values through exploratory numerical methods and through application of basic algebraic principles.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

SLO # 8 - 67.6% / 2.4 %

Analysis and Plan:

SLO # 8 Introduce the idea of a limit a little earlier in the course so that students obtain more practice employing the concept of a limit. For many students this is a new topic entirely and it has been traditionally squeezed into the course schedule at the end of the course. Even so, the results show that the students are close to the 70% success rate.

Math C141 - SLO # 9 Apply multiple approaches to problem solving using algebraic, graphical, and numerical methods to solve applied problems in other areas of mathematics, natural sciences, computer graphics, and computer animation.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

SLO # 9 - 52.0% / 18.0 %

Analysis and Plan:

SLO # 9 Allow more class time and give more examples that involve the solving of applications.

Math C255

SLO # 4 Demonstrate the interrelationship of real world situations to the ODE's and modeling associated using formula development, direction fields, and phase lines.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

Not Assessed.

Analysis and Plan:

The department will need to discuss whether they want to keep this SLO as part of the curriculum or not and if changes are not made to the COR then it will need to be assessed.

Math C255

Results of the outcomes were much higher this spring than in the previous assessment. The class size was substantially smaller than in a previous year which may or may not of had an effect on the scores. The instructor did not assess the outcomes "Perform computations and graphical interpretations using computational and mathematical software" and "Demonstrate the interrelationships of real world situations to the ODE's and modeling associated applications using formula development, direction fields, and phase lines." However, all of the other 7 SLOs in Curricunet as well as two additional SLOs not in Curricunet had results in the high seventy, eighty and 90 percents.

Type:

SLO

Semester Assessed:

Spring 2014

Target Missed/Gap Detected:

SLO #4 and #9 Not Assessed

Analysis and Plan:

While the instructor did not assess this particular outcome, the instructor did opt to teach and assess two additional outcomes not in Curricunet, (computing Laplace Transforms and finding equilibrium points using properties of non-linear ordinary differential equations.) In future assessments, it will be stressed that all outcomes in Curricunet must be assessed.

Progress Made on Prior Year Initiatives

The Department of Mathematics plans to continue its close alignment with the Basic Skills Committee. The department will review and discuss student success strategies made by the Basic Skills Committee. The department seeks to implement such strategies sh

Progress Made:

The department has continued to maintain its close alignment with Basic Skills by having a full-time math faculty member attend regularly scheduled Student Success Committee meetings. This math faculty member has also been part of the Data Team which over the past year has collaboratively reviewed student success data, surveyed instructors in regards to teaching strategies to increase retention and success and identified trends in data for several disciplines including math.

Math faculty have attended "Strengthening Student Success" workshops to gain insight about innovative practices used by other community colleges in the state to augment student success. In seeing the emphasis that some other colleges are placing on core math curriculum, two of the math faculty are now discussing how we might integrate something similar at our college. However, this is just in the dialog state at this point.

The department has written Learning Skills and Self-Efficacy skills into the CORs for two Basic Skills Math Courses and has assessed these soft skills in on-ground sections.

The Math Department continues to run an accelerated Math C020/C040 combination course to move students through the remedial math sequence as efficiently as possible.

Continue to offer on-site and online Calculus I, II, III, Differential Equations, and Linear Algebra.

Progress Made:

The department continues to offer Calculus I, II, and III every semester alternating between on-ground delivery at IWV and online delivery. Differential Equations continues to be offered once a year but in an on-ground delivery only. Linear Algebra is currently being offered only online. The sequence of higher level math courses has now been written into a long term schedule which the department foresees as being reliable and consistent in the future.

The full-time faculty teaching load is currently not well represented for the on-ground higher level math courses. In future semesters the department will seek to have a full-time faculty member teaching at least one on-ground class at the Calculus level or higher. Currently, these higher level math courses are taught on-ground exclusively by adjuncts.

Initiatives for Next Academic Year

Objective 1.1: Increase the percentage of students who successfully complete 12 units within one year using 2011-12 as the baseline year.

Strategic Plan Goals Addressed:

Action Plan:

The department has discussed and identified the need to keep at least one section if not more of Math C020 Basic Arithmetic in order to provide entry access to all students. In order to meet the goal of increasing the percentage of students who successfully complete 12 units in the remedial math sequence within one year, the department will continue offering a Math C020/C040 combination class in the fall of 2015. Students enrolled in Basic Arithmetic who are identified early as being able to complete PreAlgebra will be given extra assignments which are equivalent to those of a regular Math C040 PreAlgebra course. If successful, these students can enroll into Math C050 in the spring and take Math C055 over the summer allowing them to complete 12 units within one year.

The department would also like to look at placement scores and ensure that students are being placed appropriately into Math C020 and C040.

Measure of Success:

Track the number of completions in the Math C040/C050 sequence through spring and summer sessions.

Expected Completion:

Fall 2016

Person Responsible:

Steve Rogers / Yihfen Chen

Designed:

It is designed to increase student success

Student Experience:

First Year, Intake, Remediation

All Full-Time Instructors Provide 3 Hours Per Week of One-to-One or Small Group Math Tutoring in the LAC**Strategic Plan Goals Addressed:**

1

Action Plan:

Objective 1.2: Continue to provide students with easy access to tutoring by having the full-time faculty conduct at least 3 hours per week of their office hours in the LAC. Many students are still not aware of this service and the plan is to formally announce to students in Math C055, Math C121, C141, and C142 that these services are readily available.

Measure of Success:

The success of this strategy can be measured by following a 3-year cohort group and looking for an upward trend in transfer level enrollments as well as transfer level completions at Cerro Coso College. Data of this type is already being collected so no new process needs to be implemented.

Expected Completion:

Fall 2016

Person Responsible:

Steve Rogers

Designed:

It is designed to increase student success

Student Experience:

2nd Year/Program Completion, First Year, Intake, Remediation

Resource Needs

Facilities

Some math instructors are still being scheduled in classrooms with chalkboards in the East-Wing. The Math Department would like to see all East-Wing classrooms be equipped with whiteboards.

Information Technology

More full-time and adjunct math faculty are requesting classrooms with smartroom technology. The Math Department requests that all East-Wing classrooms be outfitted with this technology.

Marketing

The number of students pursuing the online math degree is small. It is suspected that there are many students who would pursue this degree but who are simply not aware of it. The department is currently considering ways of marketing this online degree or at least making its existence known to potential students outside of our immediate service area.

Professional Development

This year the department sent two full-time math faculty to the "Strengthening Student Success" Conference in Costa Mesa. These two faculty members were able to attend workshops where they could see first hand what other community colleges are doing to address topics such as acceleration, retention and completions in the math sequence. These two instructors have already begun discussions on implementing new strategies but will need to follow up with more discussion across the entire department. All full-time and adjunct math faculty continue to attend scheduled flex day activities as well as pursue professional development activities on their own.

Staffing

The Math Department provides instruction in several courses which are prerequisite courses for required courses in other programs. Elementary Algebra, Math C050, is a prerequisite course for courses in Biology, Electronics, and Business while Intermediate Algebra, Math C055, is a prerequisite for courses in Biology, Chemistry, and Computer Science. The 100 level math courses such as Elementary Probability and Statistics, Math C121, fulfill the mathematical concepts or quantitative reasoning requirements for several departmental programs including Kinesiology, all of the Liberal Arts, and Psychology. Currently the Math department has been able to continuously offer these supporting courses at various time blocks, at various campus sites as well as in both an on-ground and online delivery. There is a long term schedule that students can rely on for a consistent and sequential offering of these courses from year to year. However, the Math Department is currently understaffed with full-time faculty, with many of the upper level courses being taught by adjuncts. The department currently also struggles to cover the majority of its Basic Skills Math courses with full-time faculty where interventions, best practices and teaching strategies would have the most impact in moving students successfully through the remedial math courses. In light of the fact that the department endured the resignation of one full-time faculty member in the fall of 2014, it is vital to hire a full-time tenure-track math faculty in order to sustain the level of support provided to various departments that the college has relied upon in the past.

Resource Requests

1000 Category - Certificated Positions

One Full-Time Math Instructor

Location:

Ridgecrest/IWV

Priority:

High

Strategic Plan Goals Addressed:

1

Estimated Amount of Funding Requested:

Full-Time Tenure Track Salary, Ongoing from .

Detailed Rationale:

The Math Department provides instruction in courses which are prerequisites and required courses for several programs. In order to continue to offer these courses onground consistently in a logical semester sequence during regularly scheduled time blocks, the Math Department foresees an immediate need for another full-time Math Instructor.

The online math courses in the remedial sequence routinely have waitlists of 20 or more students.

Currently, the department is surviving by employing the services of several math adjuncts. However the on-ground ratio of full-timers to adjuncts should be higher. It currently is 50:50 at bothe the lww and Eastern Sierra campuses.

There should also be more full-time presence in the area of Basic Skills Math Instruction since improving completion and acceleration through the remedial math sequence is one of the department's top priorities.

The department currently has all of the higher-level math courses being taught by adjuncts and this is also a concern if the department wishes to see growth in the number of math majors.

2000 Category - Classified Staff

Location:

Priority:

Strategic Plan Goals Addressed:

Salary Grade:

Number of Months:

Number of Hours per Week:

Salary Amount:

, from .

Detailed Rationale:

Not required at this time

Location:

Priority:

Strategic Plan Goals Addressed:

Salary Grade:

Number of Months:

Number of Hours per Week:

Salary Amount:

, from .

Detailed Rationale:

4000 Category - Supplies and Equipment

Ten TI84 Plus Calculators

Location:

Kern River Valley

Priority:

Medium

Strategic Plan Goals Addressed:

2

Estimated Amount of Funding Requested:

\$1000, One-time from .

Detailed Rationale:

It is important for students taking Statistics to be able to have at their disposal an appropriate technology to insure success and in order to get the most out of a Statistics course. The emphasis can be placed on interpretation of results as opposed to the meaningless memorization of formulas. This class is a requirement for several programs at the KRV campus however many students typically enrolled in this course are unable to afford the prohibitive cost of owning their own graphing calculator. The current math instructor at the KRV site excels at teaching using this technology. The calculators could be rented out to students for \$10 per semester which would save the students money and the calculators could be reused annually.

5000 Category - Service, Utilities, and Operating Expenses

None needed at this time.

Location:

Priority:

Strategic Plan Goals Addressed:

Estimated Amount of Funding Requested:

, from .

Detailed Rationale:

6000 Category - Capital Outlay

None needed at this time.

Location:

Priority:

Strategic Plan Goals Addressed:

Estimated Amount of Funding Requested:

, from .

Detailed Rationale: