

Mathematics Department

Annual Unit Plan for Academic Year 2016-2017

November 2015

Describe 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 . Currently, three full-time faculty serve the IWV campus. One full-time faculty serves the KRV campus , and one full-time faculty serves the ESCC campuses. Courses offered at SK and Tehachapi campuses are taught by adjunct faculty. A full-time High School Math Faculty also teaches dual enrollment math courses at Tehachapi High School.

Report on Improvements Made and Gaps Identified in the Prior Year

Student Equity

For math, retention rates were 7% lower than collegewide while success rates for math were 12% lower than collegewide

Population:

Age: 40 or older

Analysis and Plan:

All on-ground sections of remedial math classes at the IWV site will have a strategy in place for spring 2016 that will strongly encourage students to routinely visit the math lab. The IWV full-time instructors have agreed to look into implementing supplemental skill-building assignments which would need to be completed in the lab. It is hoped that by having to complete the assignments in the lab, students will take advantage of the extra instruction that can be provided by faculty who are there as well. The assignments will be geared towards strengthening skills for students who have been away from academic math for some number of years as well as reflect student learning outcomes that scored under the 70% target in the most recent assessment. In this manner, the department hopes to target both the retention and success gaps observed for the older adult population in math.

Other strategies the department will use to provide academic support will be:

Design a Pre-Statistics course which will use contextualized learning units to review and remediate math skills.

Systemic tutoring referrals

Publicize LRC workshops on the syllabus or promote participation through announcements in the course.

The success rate in math for white ethnicity was 7% lower than the success rate collegewide

Population:

Ethnicity: White

Analysis and Plan:

Although success rates for white students were lower in math than those college-wide, white students were still the second highest scoring ethnicity in terms of math success rates. So even though this gap of 7% in success between Math and college-wide success may appear to be significant, the department feels that it is more imperative to focus on strategies to increase math success rates for African American and American Indian which are 14% and 12% lower respectively than the success rates for white students.

One strategy the department would like to pilot is to give an assessment exam early in the Basic Skills courses. Students who do well on the assessment exam could then be placed in a higher level course. This would allow instructors to spend more time remediating skill deficiencies of other students.

Outcomes Assessment: Overall Report

Over the past year there has been little, if any communication among faculty as to whether the suggested strategies for outcomes that missed the target have actually been implemented. One reason is that different instructors are teaching the courses, sometimes a different instructor every semester as is the case for College Algebra which had quite a few outcomes that scored below the target in the last assessment. However, a general awareness of outcome assessment in all sections has increased amongst all math faculty as a direct result of requiring an assessment in ALL sections. All math faculty are now including student learning outcomes on the first page of their syllabuses and designing their instruction around these outcomes. Instructors are having discussions about the topics that students have the most difficulty with in specific courses. It is hoped that as this awareness increases, not only will math faculty understand the assessment sequence, but that a standardized assessment will be implemented for each course. By doing this in the near future, the assessment process can be carried out more seamlessly as well as more frequently to provide better quality data.

Outcomes Assessment: Gaps Identified in Prior Year's Assessments

Elementary Algebra Math C050

Type:

SLO

Target Missed/Gap Detected:

Graph Linear Equations and Inequalities 60.2% / 9.8%

Type of Gap:

Need to alter/refine instructional techniques. Other (explain in Analysis).

Analysis and Plan:

Students need more repetition and practice with linear graphing.

Beginning in spring 2016, the department will require a minimum of one additional linear graphing assignment, that will need to be completed in the math lab with assistance/ tutoring/ advising from math lab faculty in all on-ground sections of Math C050 at IWV.

Elementary Algebra Math C050

Type:

SLO

Target Missed/Gap Detected:

Work effectively with exponents and square roots. 58.9% / 11.1%

Type of Gap:

Other (explain in Analysis).

Analysis and Plan:

Students need more practice working with exponents and square roots in order to feel comfortable employing all of the properties of exponents.

Beginning in spring 2016, the department will require a minimum of one additional exponent and square root assignment that will need to be completed in the math lab with the availability of assistance/ tutoring/ advising from math lab faculty in all on-ground sections of Math C050. This additional assignment will be the same for all sections and will be designed to specifically address the gap in this outcome.

Elementary Algebra Math C050

Type:

SLO

Target Missed/Gap Detected:

Translate phrases and sentences to equations and solve applications. 68.1% / 1.9%

Type of Gap:

Need to alter/refine instructional techniques.

Analysis and Plan:

Since this outcome missed the target by less than 2%, just an informal refinement in instructional techniques will be implemented. Since problem solving and applications are included in the prerequisite courses, instructors will be encouraged to emphasize the skill of translation of English sentences to algebraic equations in the Basic Arithmetic and Pre-Algebra courses.

Intermediate Algebra Math C055

Type:

SLO

Target Missed/Gap Detected:

Perform Operations with Algebraic Fractions 67.5% / 2.5%

Type of Gap:

Need for revision to assessment method.

Analysis and Plan:

This outcome did not fall short of the 70% target by much. This is indicative that students understand how to work with algebraic fractions. The small gap that does exist could probably be eliminated by simply selecting better problems to include in the assessment.

Intermediate Algebra Math C055**Type:**

SLO

Target Missed/Gap Detected:

Graph and write the equation of a line 63.4% / 6.6%

Type of Gap:

Other (explain in Analysis).

Analysis and Plan:

Increase the time spent on 2-dimensional graphing in both Math C050 and Math C055.

Beginning in spring 2016, the department will require a minimum of one additional linear graphing assignment that will need to be completed in the math lab with the availability of assistance/ tutoring/ advising from math lab faculty in all on-ground sections of Math C055. This additional assignment will be the same for all sections and will be designed to specifically address the gap in this outcome.

Intermediate Algebra Math C055**Type:**

SLO

Target Missed/Gap Detected:

Graph a parabola. 64.6% / 5.4%

Type of Gap:

Other (explain in Analysis).

Analysis and Plan:

Beginning in spring 2016, the department will require a minimum of one additional assignment covering the graphing of parabolas. Students will need to visit the math lab and work with math lab faculty in all on-ground sections of Math C055 to complete this

graphing assignment. This additional assignment will be the same for all sections and will be designed to specifically address the gap in this outcome.

Intermediate Algebra Math C055

Type:

SLO

Target Missed/Gap Detected:

Solve Linear Systems of Equations 66.2 % / 3.8%

Type of Gap:

Need for revision to assessment method. Need to alter/refine course content. Need to alter/refine instructional techniques.

Analysis and Plan:

Instructors frequently spend too much time showing several methods for solving systems of equations. Going forward, it is recommended that instructors focus on the substitution and elimination methods exclusively in class and work towards mastery instead of just exposure. Other methods could be taught through an additional assignment at the discretion of individual instructors outside of class in the math lab.

Probability and Statistics Math C121

Type:

SLO

Target Missed/Gap Detected:

Calculate the mean and variance of a discrete distribution. 67.0 % / 3.0%

Type of Gap:

Analysis and Plan:

The Probability and Statistic course has too many outcomes. These 16 outcomes were put into place in order to match the CID descriptor for this course. However the department has decided to align these 16 outcomes into just four general SLOs by the next assessment date. This strategy will not only make assessing outcomes easier but will allow some overlap of results of this outcome with other outcomes that were above the target.

Probability and Statistics Math C121

Type:

SLO

Target Missed/Gap Detected:

Calculate probabilities using normal and student t-distribution. 64.9% / 4.1%

Type of Gap:

Analysis and Plan:

The Probability and Statistic course has too many outcomes. These 16 outcomes were put into place in order to match the CID descriptor for this course. However the department has decided to align these 16 outcomes into just four general SLOs by the next assessment date. This strategy will not only make assessing outcomes easier but will allow some overlap of results of this outcome with other outcomes that were above the target.

Probability and Statistics Math C121**Type:**

SLO

Target Missed/Gap Detected:

Determine and interpret levels of statistical significance including p-values. 56.5% / 13.5%

Type of Gap:**Analysis and Plan:**

The Probability and Statistic course has too many outcomes. These 16 outcomes were put into place in order to match the CID descriptor for this course. However the department has decided to align these 16 outcomes into just four general SLOs by the next assessment date. This strategy will not only make assessing outcomes easier but will allow some overlap of results of this outcome with other outcomes that were above the target.

Probability and Statistics Math C121**Type:**

SLO

Target Missed/Gap Detected:

Determine the Output of a technology-based statistical analysis

Type of Gap:**Analysis and Plan:**

The Probability and Statistic course has too many outcomes. These 16 outcomes were put into place in order to match the CID descriptor for this course. However the department has decided to align these 16 outcomes into just four general SLOs by the next assessment date. This strategy will not only make assessing outcomes easier but will allow some overlap of results of this outcome with other outcomes that were above the target.

Probability and Statistics Math C121**Type:**

SLO

Target Missed/Gap Detected:

Select the appropriate technique for testing a hypothesis and interpret the result. 64.1% / 5.9%

Type of Gap:

Need for revision to assessment method.

Analysis and Plan:

The Probability and Statistic course has too many outcomes. These 16 outcomes were put into place in order to match the CID descriptor for this course. However the department has decided to align these 16 outcomes into just four general SLOs by the next assessment date. This strategy will not only make assessing outcomes easier but will allow some overlap of results of this outcome with other outcomes that were above the target.

Business Calculus Math C131

Type:

SLO

Target Missed/Gap Detected:

All assessed outcomes were above 70%.

For the outcome of use calculus to analyze revenue, cost, and profit there was no assessment done.

Type of Gap:

Other (explain in Analysis).

Analysis and Plan:

The department will need to discuss whether this SLO will be included in the next assessment. If not, then it will need to be removed by doing a course revision prior to doing the next assessment.

Math C142 Trigonometry

Type:

SLO

Target Missed/Gap Detected:

All assessed SLOs results were above the 70% target. There were two SLOs that were not assessed.

"Analyze trigonometric equations to determine what combination of algebra and identities lead to a solution"

"Apply Trigonometry to operations with complex numbers"

Type of Gap:

Other (explain in Analysis).

Analysis and Plan:

The department will need to discuss whether these SLOs will be included in the next assessment. If not, then they will need to be removed by doing a course revision prior to doing the next assessment.

Calculus II Math C152

Type:

SLO

Target Missed/Gap Detected:

All SLOs were assessed and all results were above the target of 70%.

Type of Gap:

Other (explain in Analysis).

Analysis and Plan:

No improvement plan needed at this time.

Progress Made on Program Review

AS-T in Mathematics

Year of Last Program Review:

Never Been Reviewed

Progress in the last year on two-year strategies:

The department has hired a tenure- track full-time faculty who will help prepare students for the AS-T Degree

The department has aligned its Student Learning Outcomes with its Program Learning Outcomes

The department has established a long-term schedule of course offerings by semester.

The department has put in place a 5 year course SLO assessment schedule.

The department has identified math success rate gaps as well as equity issues and has planned strategies to address these.

The department has initiated dual enrollment math courses at Tehachapi High School as well as math courses at the Tehachapi Center which in the future could supply an excellent cohort of students to either of the math programs at Cerro Coso College.

Progress in the last year on five-year strategies:

The department has continued to offer a combination Basic Arithmetic/ Pre-Algebra course every semester in order to decrease the time required for students to progress through the remedial sequence.

The department has tried to implement Supplemental Instruction in Basic Skills Math courses. This strategy was unsuccessful and the department has now decided to abandon this strategy in order to focus fully on the math lab.

For the online AS-T degree, the department has made no progress on obtaining an online course management system to support

an online Differential Equations course. Therefore the department continues to lose prospective math majors who are not local to the area due to the fact that the program is not 100% online at this time.

Progress Made on Prior Year Initiatives

Implement Supplemental Instruction In Some Basic Skills Math Courses

Initially the Math Department attempted to implement supplemental instruction meetings but was only able to obtain one student volunteer to lead the group sessions. She decided not to continue being a leader in the first week. Due to the fact that there is a lack of students who are interested in becoming leaders and the students have the option of deciding whether to attend SI sessions, as well as an inability to sell the program to all math instructors, the department is no longer pursuing supplemental instruction. Rather than encountering resistance to scaling SI out to all of the sites and online, the department decided to focus all of its efforts on the more direct strategy of implementing a math lab as a means of helping basic skills math students.

All Instructors Provide 3 Hours Per Week of One-to-One or Small Group Math Tutoring in the LAC

This intervention has not only been successful over the last year but it is also ongoing and continues to benefit students this academic year. As an example, students who regularly attended the LAC tutoring hours where faculty led small group tutoring sessions, successfully passed Probability and Statistics in spring of 2015. These were students who originally came into the LAC because of very low exam scores. This year the entire math tutoring process has been made more formal by the implementation of a math lab where students sign in and can work directly with math faculty one-on-one or in small groups. Currently there are two adjunct faculty and three full-time faculty that are available in the lab to tutor students. However, rather than three hours per week, both full-time and adjunct faculty are tutoring two hours per week at the IWV campus. Full-time faculty at the IWV campus have also committed to requiring students to attend the math lab periodically through out the semester in Basic Skills Math courses starting in spring 2016.

Plan Initiatives for Next Year

Initiatives for Next Academic Year

Create a Pre-Statistics Course

Action Plan:

Create an alternative course as a prerequisite to Statistics which could also serve as an alternative graduation requirement in place of Intermediate Algebra.

Measure of Success:

Collect data on the number of successful completions in Statistics courses once this new course is in place and look for an upward trend.

Person Responsible:

Yihfen Chen and Steve Rogers

It directly addresses a college Strategic Goal or Objective

Strategic Goal # 2.1

Bring Additional Higher Level Math Courses to the KRV site

Action Plan:

Collaborate with high school principals in the Kern River Valley and establish a cohort of students taking Pre-Calculus and Calculus

courses.

Measure of Success:

Enrollment data

Person Responsible:

Dean Bernsten

It directly addresses a college Strategic Goal or Objective

Strategic Goal 1.2

Increase the Number of Math Course Completions for One Level Below Transfer and at Transfer Level

Action Plan:

Assign full-time and part-time instructors regular weekly hours to provide coverage in the math lab.

Measure of Success:

Yearly Data That Reflects Graduations and Transfers

Person Responsible:

Yihfen Chen, Jacklyn Kessler, and Steve Rogers

It directly addresses a college Strategic Goal or Objective

Strategic Goal 1.1 Increase Completions

Evaluate Resource Needs

Facilities

Currently some sections of math classes are being scheduled in modules that have instructor's offices in the back. Next year with the ongoing construction of main building, arrangements should be made so that all math instructors can have a classroom free of walk through distractions by other faculty or students.

Information Technology

Routinely schedule all math classes in rooms with white boards and smartroom 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

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 Requests

1000 Category - Certificated Positions

Mathematics

Location:

Ridgecrest/IWV

Justification:

The Math Department still remains understaffed even after hiring a full-time faculty over the summer to replace one faculty member who resigned in the prior year. As evidence of this, two full-time instructors routinely teach at capacity (load 1.6) every semester in order to keep up with the demand for online math courses while other full-time faculty are beyond full-load as well. One full-time faculty provides some relief by teaching two online sections but this instructor has submitted a resignation notice and may no longer be available to teach.

More specifically, the department needs an instructor that excels in teaching higher-level math courses. This is an important aspect to consider if the math transfer level program is to grow in enrollments. Since the transfer of a senior faculty member of the math department to another site, adjunct instructors alone have taught the calculus series of courses at the IWV site. The department has a very strong need for a well qualified Calculus specialist in order to continue to maintain our AS-T Math program as an attractive option for both online and local IWV math majors.

Mathematics

Location:

Ridgecrest/IWV

Justification:

1. Although there is a decrease overall in the number of students on first day waitlists in math courses than the previous years, there still are first day waitlists for both on ground and online math courses.
2. Enrollments for Calculus I and Calculus II courses remain robust. Although higher level courses such as Differential Equations and Calculus III have enrollments that are under enrolled, they continue to run every year to support Math and Science majors. The number of students declaring their major as math has almost quadrupled since fall of 2010.
3. Many of the courses in the math department are core mission in that they support pathways for other programs. There are at least 11 programs that depend on the math department to prepare students for core classes.
4. Courses are not over scheduled. The math department routinely starts with a minimum number of sections and only adds additional sections as enrollments require.
5. The department currently has the capacity to schedule math courses in all of the time blocks. There is a need to have a full-time Calculus specialist in the department in order have the flexibility to schedule the higher-level math courses so that there is a minimum of time conflicts with some of the science lab courses. Currently, all of the Calculus courses are being taught by adjunct

instructors and one adjunct is teaching at the maximum load allowed for adjuncts.

6. There is a demand for STEM majors in the local Ridgecrest area. The department needs a Calculus specialist in order to draw more local students to its on-ground Math degree.

7. It is currently unknown what the costs and/or lost revenue from gaps between student demand and course or program capacity are.

The Following Data Are for the 2014 – 15 Academic Year.

a. Overall Waitlist Size - 109 b. Department Productivity (FTES) - 314.6 c. Full-time faculty after one retirement in spring 2016 - 5 d. Number of Adjunct Faculty (Including All Sites) - 8 e. Number of Certificates Awarded - NA f. Number of Degrees Awarded - ? g. Core Curriculum Classes/ Programs - ?/ 11 h. CTE Classes - NA i. number of students at first day/ census - 2,729 / 2,332

2000 Category - Classified Staff