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Palau Community College is an accessible public educational institution helping to meet the technical, academic, cultural, social, and economic needs of students and communities by promoting learning opportunities and developing personal excellence.

Academic Program Three Year Review

Instructional Department

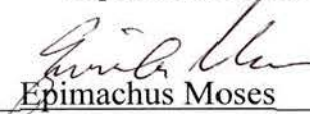
MATHEMATICS DEPARTMENT

Period of Three Year Review


August 2012 – July 2015

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Department Instructor(s)


Date: January 31, 2016

Department Chair:  Epimachus Moses

Date: 2/1/2016

Dean of Academic Affairs:  Robert Ramarui

Date: 2/1/16

IR office: received 02/01/2016 
LTSara

Department Review Narrative Summary

- **Summary of the academic department purpose**

The teaching of mathematics at Palau Community College began in 1969 when the college was known as Micronesian Occupational Center (MOC), a two-year post-secondary vocational/technical institution. The mathematics courses provided concepts and skills that supported the vocational and technical programs in the college. Over the years, the department main goals have continued to expand supporting academic programs such as Business Accounting, Criminal Justice, Education Programs, Environmental Science, Liberal Arts, Library Science, and Science Technology Engineering & Mathematics (STEM). The department now has eleven (11) courses which provide quality instructions for both academic and technical programs. The department main goals are to:

- ❖ Provide students with learning opportunities to extend their study of mathematics in order to communicate mathematical ideas effectively either orally or in writing.
- ❖ Provide students in vocational and non-vocational programs with mathematical concepts and problem-solving skills to be successful in their chosen field of specialization.
- ❖ Develop student's ability in precise and accurate skills in mathematical computation.

- **The relationship of department to the college Mission Statement**

PCC Mission Statement:

Palau Community College is an accessible public educational institution helping to meet the technical, academic, cultural, social, and economic needs of students and communities by promoting learning opportunities and developing personal excellence.

The goals of the Mathematics Department at Palau Community College is directly linked to the mission of the college, that is to provide learning opportunities for all students in mathematics which supports all the college programs. It promotes the study of mathematics in-depth in preparation for a college degree or an immediate career, support the mathematical needs of other courses, and supply a curriculum for all students to enhance their understanding of mathematical thought in their technical, academic, and economic needs.

- **Summary of Program Data**

a.

Figure 1 - Student Status

	Fa 2012	Sp 2013	Su 2013	Fa 2013	Sp 2014	Su 2014	Fa 2014	Sp 2015	Su 2015	Average
Enrollment	307	272	62	283	227	78	221	211	54	191
Pass/Credit	46%	51%	79%	48%	50%	83%	76%	56%	91%	65%
Fail/No Credit	38%	34%	19%	37%	29%	6%	17%	33%	0%	24%
Audit	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Withdraw	16%	15%	2%	15%	21%	10%	7%	11%	9%	12%

Figure 1 above shows the total and average enrollment of students in all math courses in a given semester, along with number of students who passed, failed, audited, and withdrew from the courses. The data show the average enrollment of 191 students per semester, with 65% passing, 24% failing, and 12% withdrawing from the courses. The numbers show that majority of the students who enroll in math courses successfully complete the courses.

Figure 2 – Class Information

	Fa 2012	Sp 2013	Su 2013	Fa 2013	Sp 2014	Su 2014	Fa 2014	Sp 2015	Su 2015	Average
Under 10 Students	17%	6%	33%	6%	31%	20%	21%	40%	0%	19%
10 – 19 Students	22%	44%	67%	50%	31%	40%	36%	27%	75%	43%
20 – 29 Students	61%	50%	0%	44%	38%	40%	43%	33%	25%	37%
30 or more Students	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL CLASSES	18	16	6	16	16	5	14	15	4	14

Figure 2 above displays the average class size for math courses. The numbers show that, on the average, most math courses have 10-19 students, except for Fall 2012 and Spring 2015. There are math courses that had less than 10 students and those were usually the upper level courses, such as MA 112: Trigonometry, MA 211: Math for Elementary Teachers, and MA 221: Calculus I. It's important to note that each math course has a capacity of 25 students due to limited classroom sizes, and therefore, there were no classes that had 30 or more students enrolled in them.

The data also show the average of 14 sections of different math courses, are offered every semester except during the summer. Although it's not reflected in the data above, it's significant to note that the average number of sections of developmental class, MA 95: Basic Algebra offered were about five sections. That means about 37% of the total classes offered were developmental classes.

Figure 3 – Class Offering Information

	Fa 2012	Sp 2013	Su 2013	Fa 2013	Sp 2014	Su 2014	Fa 2014	Sp 2015	Su 2015	Average
Total Prog/Dept Classes Taught	18	16	6	16	16	5	14	15	4	12
Total Lecture ONLY Classes	67%	56%	50%	56%	50%	40%	71%	60%	75%	58%
Total Lab ONLY Classes	0	0	0	0	0	0	0	0	0	0%
Total Lecture and Lab Classes	33%	44%	50%	44%	50%	60%	29%	40%	25%	42%
Total Online Classes	0	0	0	0	0	0	0	0	0	0%

Figure 3 above represents number and type of classes offered in a given semester. The data show that majority of math courses offered were lecture only. There were no math courses that are lab only classes and there were no classes that were offered online.

There are only two math courses that are lecture and lab courses; MA 95: Basic Algebra and MA 211: Mathematics for Elementary Teachers. MA 95 is a developmental class which is prerequisite to majority of the math courses as well as a requirement for other programs. MA 211 is a methodology class for elementary teachers which require students to practice and showcase what they learn in terms of lesson plans, presentations, and class projects.

The lecture only classes include MA 100: Technical Mathematics, MA101: Math for Mechanics, MA105: Intermediate Algebra, MA 110: Survey of Mathematics, MA 111: College Algebra, MA 112: Trigonometry, MA 121: Elementary Statistics, MA 157: Mathematics and Numeracy Teaching, and MA 221: Calculus I. Even though MA 100 and MA 101 are lecture only classes, students in these courses are still required to demonstrate the concepts they learnt by means of hands-on activities or skills tests. In fact, both classes use practical applications (skills test) as an additional tool of measurement to evaluate students at the end of each semester. The remaining courses also allow students to show their understanding and knowledge of subject matter through cooperative learning class activities.

b. Figure 4 – Faculty Information

	Fa 2012	Sp 2013	Su 2013	Fa 2013	Sp 2014	Su 2014	Fa 2014	Sp 2015	Su 2015
Full Time Faculty	3	3	1	3	3	1	3	3	1
Part Time Faculty	4	2	2	1	3	3	4	3	2
TOTAL FACULTY	7	5	3	4	6	4	7	6	3

Figure 4 above display the number of full time and part time faculty who teaches math courses. The data shows that there were three full-time faculties from Fall 2012 to Spring 2015 except in the summers with only 1 full-time faculty. The number of part time faculty ranged from one to four per semester, which shows that there was always a need to hire part-time faculty to teach math courses.

c. Table 1 – Faculty Student Ratio Information

	Fa 2012	Sp 2013	Su 2013	Fa 2013	Sp 2014	Su 2014	Fa 2014	Sp 2015	Su 2015
Full Time Faculty	1:58	1:78	1:32	1:81	1:63	1:34	1:50	1:52	1:11
Part Time Faculty	1:33	1:19	1:15	1:39	1:12	1:15	1:18	1:18	1:22
TOTAL FACULTY	7	5	3	4	6	4	7	6	3

Table 1 above displays faculty to student ratio. The data shows that full time faculties had as low as 11 students and as high as 81 students per semester. On the other hand, part time faculty had as low as 12 students and as high as 39 students in a given semester. As previously mentioned, most high-level math courses had less than 10 students which were always taught by full time faculty. The reason behind high faculty to student ratio for full time faculties was that they taught an average of 4 to 5 sections of math courses per semester, compared to part time faculties who taught an average of 2 to 3 sections of courses each semester. The significance of these data, as previously mentioned, is that there was always a need to hire adjunct faculty each semester because there was always a need to offer more sections of math courses, especially the MA 95 developmental class.

- **Summary of Student Learning and Curriculum**

Currently, there are a total of 11 courses under the math department, which all of them have course learning outcomes (CLOs). The CLOs are updated and modified as necessary. Any changes will be reflected in student learning outcomes, materials and equipment, texts and references, method of evaluation, course learning outcomes, and the rubric used to assess each course. The course outlines and all supporting documents will be submitted to CPC in Fall 2015 for approval and will begin its implementation in Summer 2016.

Furthermore, all course CLOs have been aligned with GE PLOs and ILOs in the math department mapping (see appendix C). Signature assignments used in course assessments also have been identified (see appendix D).

- **Summary of Course Assessment Data**

- a. **How has assessment of course-level student learning outcomes led to improvement in course-level student learning?**

The course assessments results have impacted significant changes to course-level student learning. The changes include:

- 1) Modified course learning outcomes to the following courses to show a better picture of what students were learning in the classroom.

- a. MA 95: Basic Algebra – To streamline the assessment process and to meet the new catalog requirements, the number of CLOs will change from six to five. CLOs 2 and 3 will be combined for the new CLO 2. The following table shows the changes.

Old CLOs	New CLOs
1. Solve numerical expressions involving rational numbers.	1. Simplify and evaluate numerical expressions with whole numbers, fractions, decimals, integers, and integer exponents.
2. Solve problems involving one-degree equations.	2. Solve problems involving one-degree equations and inequalities.
3. Solve problems involving one-degree inequalities.	3. Simplify and solve problems involving polynomials.
4. Simplify polynomials.	4. Factor polynomials with various methods and solve application problems with factoring.
5. Factor polynomials with integral coefficients.	5. Simplify rational expressions and solve equations containing fractions.
6. Simplify rational expressions and solve rational equations.	

- b. MA 111: College Algebra – The CLOs were modified with more details so the specific content can be addressed in the assessment tools better. The following table shows the changes.

Old CLOs	New CLOs
1. Solve problems with linear equations, and graph a linear function.	1. Graph linear functions, write equations of lines, and solve linear equations and variation problems.
2. Perform operations on functions, and graph a non-linear function.	2. Graph non-linear functions, perform operations on functions, and find compositions and inverses of functions.
3. Solve application problems with exponential and logarithmic equations, and graph an exponential and logarithmic function.	3. Graph exponential and logarithmic functions and solve application problems with exponential and logarithmic equations.
4. Solve polynomial equations with rational and irrational solutions.	4. Solve polynomial equations with rational and irrational solutions.
5. Solve system of equations using different methods.	5. Solve systems of equations with various methods, perform matrix operations, solve matrices, and graph linear inequalities involving 2 variables.

- c. MA 211: Mathematics for Elementary Teachers– To streamline the assessment process and to meet the new catalog requirements, the number of CLOs will change from ten to six. The number concepts from the old CLOs 3 to 6 will be combined for the new CLO 3. The measurement and geometry concepts from the old CLOs 8 and 9 will be combined for the new CLO 5. The following table shows the changes.

Old CLOs	New CLOs
1. Explain the problem solving process and implement various problem solving strategies to solve problems.	1. Explain the problem solving process and implement various problem solving strategies to solve problems.
2. Describe basic number concepts, number relationships, and number sense.	2. Describe basic number concepts, number relationships, and number sense.
3. Explain the structures for the basic operations (addition, subtraction, multiplication, and division).	3. Explain the concepts of whole numbers, fractions, decimals, and percents and algorithms for basic operations using these numbers.
4. Explain the concepts of whole numbers and algorithms for basic operations using these numbers.	4. Explain ratio and proportion and solve problems with proportions.
5. Explain the concept of fractions using various models and demonstrate the different computational algorithms for fractions and their limitations.	5. Explain the concepts of measurement, describe properties of geometric shapes, and explain basic concepts of geometric thinking.
6. Explain the relationship between decimal and percents and solve problems with decimal and percents.	6. Explain and apply concepts of data analysis and probability.
7. Explain ratio and proportion and solve problems with proportion.	
8. Explain and demonstrate the process of measuring and solve problems involving measurement.	
9. Describe properties of geometric shapes and construct various geometric shapes.	
10. Explain and demonstrate the concepts of data analysis and probability.	

- 2) Modified signature assignments used to assess courses. Some courses were assessed using only the Final Exam which resulted in very low competency level. To standardize all math classes and for better assessment of the signature assignments, all math classes will have the midterm and final exams as their signature assignments except for MA 157. As a result, these modifications will yield better assessment results.

- 3) Shared teaching methods by both full time and part time instructors that also have resulted in better assessments' results.

- **Summary of Evaluation of Previous Goals/Activities from Previous Cycle (section 5, page 20)**

- a. **List actions identified in your last department review or any other related plan(s).**

- i. Attend trainings/conferences relevant to mathematics for technologies. **Status: Incomplete**
- ii. Attend trainings/conferences relevant to methodologies in teaching mathematics. **Status: Complete**
- iii. Hire one full time mathematics instructor. **Status: Complete/Plan reinstated**
- iv. Hire two full time assistant instructors to assist in MA 95 lab. **Status: Incomplete**
- v. Prepare updated standardized tests for college level math courses. **Status: Ongoing**
- vi. Create math course, namely MA 102, for programs such as General Electronics (GE), Electrical Technology (ET), and Refrigeration & Air-Conditioning (AC). **Status: Complete**
- vii. Conduct monthly departmental meeting. **Status: Ongoing**

- b. **What measurable outcomes were achieved due to the actions completed?**

Out of the 7 action plans listed in the last program review, only three were identified as complete – hiring of a full-time math instructor, attending trainings/conferences relevant to methodologies in teaching mathematics, and completing the math course for Electrical Technology (ET).

The plan to hire a full time math instructor was completed but the instructor resigned in summer of 2014. Another instructor was hired Fall 2014, but resigned in Spring 2015 due to health reasons. Thus, this plan was completed but within this three year review period needs to be reinstated as incomplete.

- c. **Evaluate the success of the completed actions. Did the completed actions lead to improvement of student learning?**

The hiring of a qualified full time math instructor led to improvement of student learning by providing more options for students to opt for different instructor. Additionally, it allowed the department to offer more sections of needed courses.

d. What modifications do you plan to make to the department in the future to improve student learning?

The changes that need to be made to the department to improve student learning will include:

- Hire one qualified full time faculty to teach needed math courses. There is still a need to use adjunct faculties to teach math courses every semester and so to hire another qualified math instructor will ensure that students are learning proper concepts that will carry them to next level math courses.
- Create a Math lab and hire assistant math instructor to manage and maintain the lab. The Math Lab will be used to enhance especially those math courses that have lab component. The space will also be used for tutoring and other activities which will strengthen instructions.
- Continue to conduct monthly meetings which will allow for instructors to share any changes/modifications they see fit to improve course learning outcomes. This plan will also ensure constant communication between faculties for improvement of courses and student learning.
- Continue to review and update course outlines to ensure better alignment between what is taught in the classroom and what is the student being evaluated on. The plan will also make sure consistent and updated alignment of CLOs to GE PLOs to ILOs.
- Participate in professional development for instructors and assistant instructors. The plan will ensure instructors are up-to-date on the latest teaching techniques and relevant information for improvement of student learning.
- Continue to assess and make necessary improvement to classrooms to ensure conducive learning environment for both faculties and students.

e. Update major changes/accomplishments since the last review.

Major accomplishments to the department since the last review include the hiring of one full time math instructor, addition of a new course (MA 157- Math and Numeracy Teaching) , updated course outlines, updated departmental mapping of CLOs to GE PLOs and ILOs, officially designated a new department chair in Fall 2014, continued assessment of math CLOs, and revisions of signature assignments.

• Summary of Department Major Strengths

The math department provides the opportunity for students to develop higher skills in advanced computation and problem analysis. The department conducts standardized tests to all sections of a course to ensure a unified method of assessments to students therein. In addition, it also conducts challenge test allowing students to move to higher level math courses through examinations.

- **Recommendations for Improvements**
 - a. **Does the student assessment data indicate overall department needs that may require support from the institution? Define these observed needs supported by assessment data.**

The results of student assessments indicate a great need to hire one qualified full time faculty to teach math courses. The assessments data also identified the need to revise signature assignments used to assess some of the courses.

- **Summary of Action Plans (See section 6, page 21)**

The math department action plans for the next three academic years include the action plans that were set in the last department review but were not completed, the ongoing plans identified in the last review, and new plans that were identified in this review. They include the following:

- i. Hire one qualified full time faculty to teach needed math courses. There is still a need to use adjunct faculties to teach math courses every semester and so to hire another qualified math instructor will ensure that students are learning proper concepts that will carry them to next level math courses.
- ii. Create a Math lab and hire two assistant math instructors to manage and maintain the lab. The Math Lab will be used to enhance especially those math courses that have a lab component. The space will also be used for tutoring and other activities which will strengthen instructions.
- iii. Continue to conduct monthly meetings which will allow instructors to share any changes/modifications they see fit to improve course learning outcomes. This plan will also ensure constant communication between faculties for improvement of courses and student learning.
- iv. Continue to review and update course outlines to ensure better alignment between what is taught in the classroom and what is the student being evaluated on. The plan will also make sure consistent and updated alignment of CLOs to GE PLOs to ILOs.
- v. Participate in professional development for instructors and assistant instructors. The plan will ensure instructors are up-to-date on the latest teaching techniques and relevant information for improvement of student learning.
- vi. Continue to assess and make necessary improvement to classrooms to ensure conducive learning environment for both faculties and students.

- **Summary of Resource Request (if any)**

All resource requests should be tied to at least one of the following:

- A General Education/Institutional Learning Outcome
- A course learning outcome

a. What GE/ILO and/or CLO does this resource request address?

Type of Resource	Description	Link to GE/ILO and/or CLO
Personnel	<ul style="list-style-type: none"> • 1 full time instructor • 1 full time assistant instructor 	<ul style="list-style-type: none"> • This resource request addresses all math department CLOs and GE/ILOs.
Facilities	<ul style="list-style-type: none"> • Room 51 • Room 52 • Room 69 • Office Space 	<ul style="list-style-type: none"> • This resource request addresses all department math CLOs and GE/ILOs.
Equipment	<ul style="list-style-type: none"> • Analog Circuit-Voltage testers (25 each class section) • Calipers (slide vernier/dial vernier/electronic vernier) (25 each class section) • Micrometer (outside/depth) (25 each class section) • Desktop Computers (10) 	<ul style="list-style-type: none"> • These resources request addresses all MA 100 and MA 101 courses CLOs and GE/ILOs.
Supplies	<ul style="list-style-type: none"> • Office Supplies 	<ul style="list-style-type: none"> • This resource request addresses all math department CLOs and GE ILOs.
Software	<ul style="list-style-type: none"> • Math Software for tutoring and instructional use 	<ul style="list-style-type: none"> • This resource request addresses all math department CLOs and GE ILOs.
Training	<ul style="list-style-type: none"> • Trainings/Workshops/Conferences such as NCTM 	<ul style="list-style-type: none"> • This resource request addresses all math department CLOs and GE ILOs.

b. What will be the anticipated outcome if resource request is granted?

Type of Resource	Description	Anticipated Outcome if Resource Request is Granted
Personnel	<ul style="list-style-type: none"> 1 full time instructor 1 full time assistant instructor 	<ul style="list-style-type: none"> Hiring another qualified math instructor will ensure that students are learning proper concepts that will carry them to next level math courses. Hiring assistant math instructor will ensure manpower to manage and maintain the lab as well as to strengthen what is taught in the classroom.
Facilities	<ul style="list-style-type: none"> Room 51 Room 52 Room 69 Office Space 	<ul style="list-style-type: none"> Furnishing classrooms will provide conducive learning environment for both faculties and students, including much needed student support services.
Equipment	<ul style="list-style-type: none"> Analog Circuit-Voltage testers ((25 each class section) Calipers (slide vernier/dial vernier/ electronic vernier) (25 each class section) Micrometer (outside/depth) (25 each class section) Computers (10) 	<ul style="list-style-type: none"> Equipping courses such as MA 100 and MA 101 with these much needed resources will provide a wholesome learning environment where students can practice hands-on skills and understanding of concepts taught in the classroom. Computers will be placed in Math lab for students' use through tutoring software. These will in turn improve student learning by allowing different avenue for which students can practice their basic skills in math.
Supplies	<ul style="list-style-type: none"> Office Supplies 	<ul style="list-style-type: none"> These resources will allow courses to be conducted in an organized manner from class planning and preparation to its assessment at the end of the semester.
Software	<ul style="list-style-type: none"> Math Software for tutoring and instructional use 	<ul style="list-style-type: none"> The resources here will allow faculty and students more time to interact and practice basic math skills.
Training	<ul style="list-style-type: none"> Trainings/Workshops/Conferences such as NCTM and other related conferences 	<ul style="list-style-type: none"> Participation in professional development for instructors and assistant instructors will provide instructors with up-to-date relevant information such as methodologies and latest technological use related to math for improvement of student learning.

Appendix A: Department Review Assessment Data

1.0 Department Data

Figure Student Status

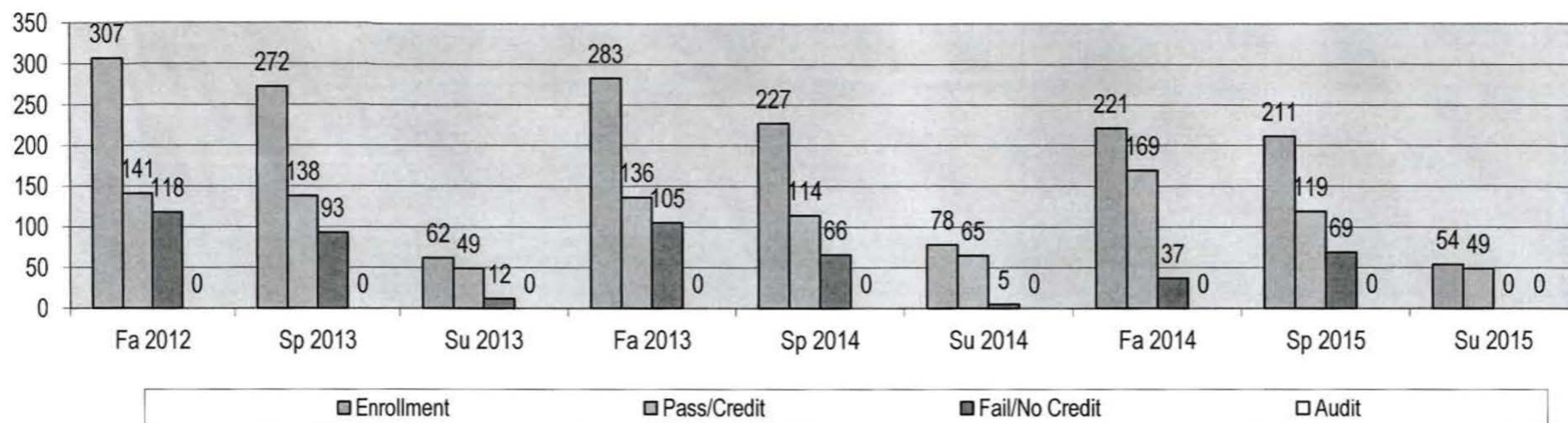


Figure 2. Number of Size of Class and Sections Conducted

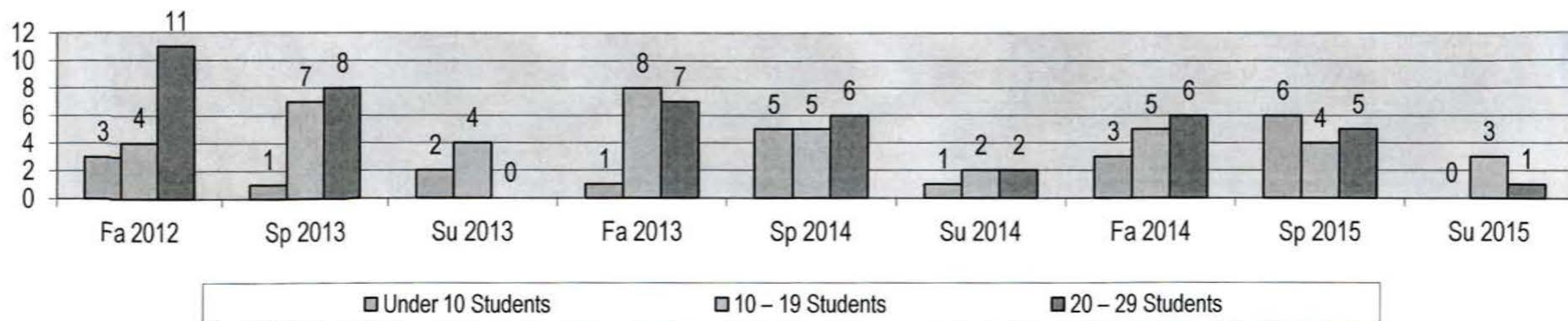


Figure 3. Class Offering

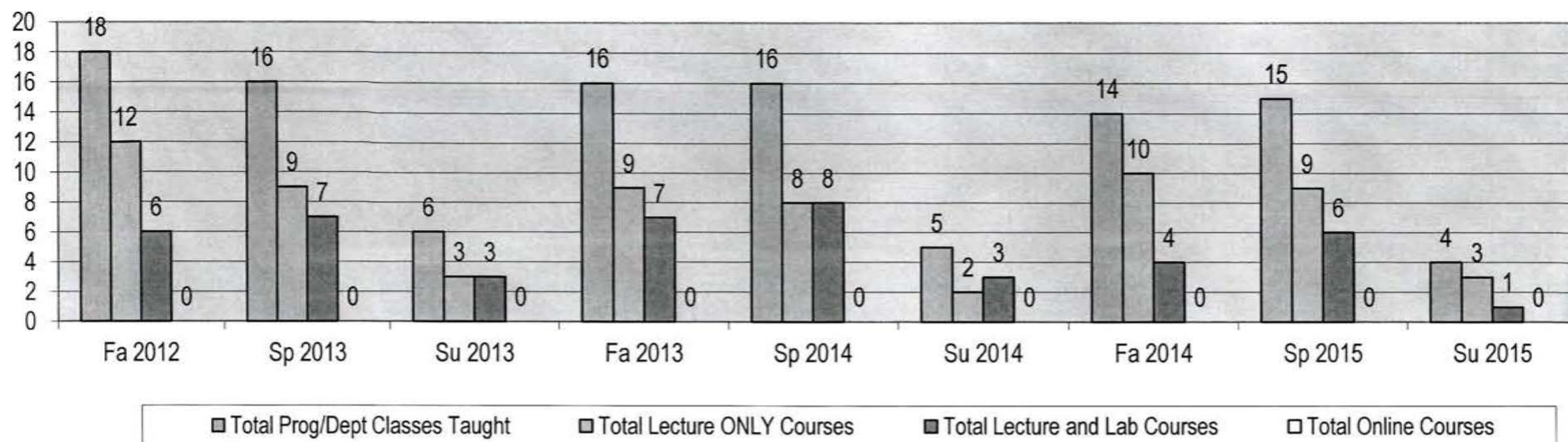


Figure 4. Faculty Head Count

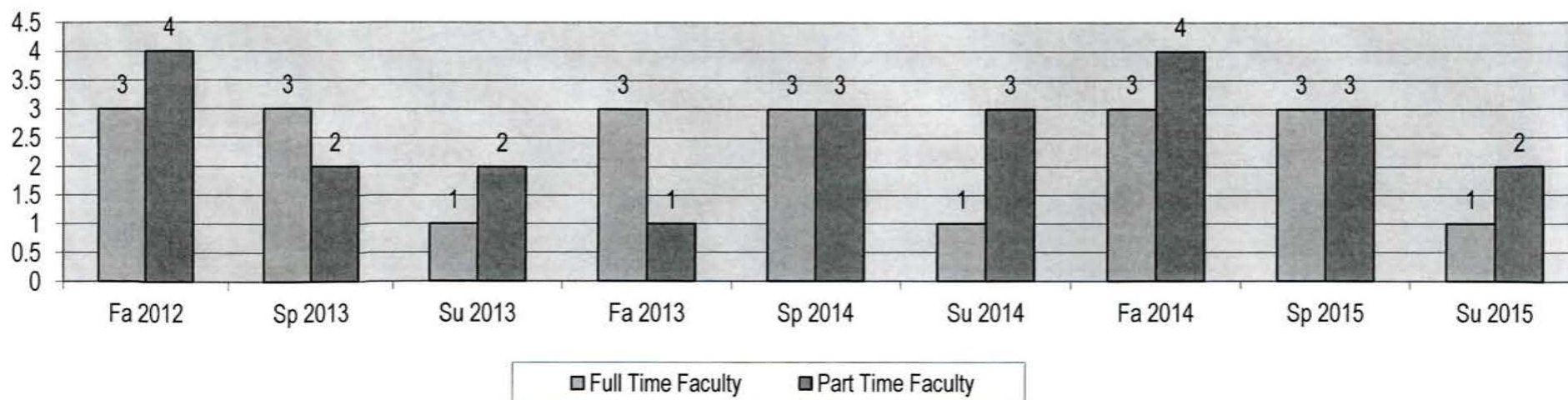


Table 1. Faculty-Student Ratio

Ratio	Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014	Summer 2014	Fall 2014	Spring 2015	Summer 2015
Full Time Faculty (F : S)	1:58	1:78	1:32	1:81	1:63	1:34	1:50	1:52	1:11
Part Time Faculty (F : S)	1:33	1:19	1:15	1:39	1:12	1:15	1:18	1:18	1:22

2.0 Student Learning and Curriculum

How many department courses are there? (refer to catalog)	%of courses with Identified CLOs	% of course outlines updated	% of courses whose Textbooks are updated (outline reflects change)	% of CLOs aligned with GE/ILOs
11	100%	100%	100%	100%

3.0 Course Assessment Data**Year 1: School Year: Fall 2012 – Summer 2013**

Semester Assessed	Course Assessed	CLO – GE/ILO Alignment	Results of Assessments
Fall 2012	MA 95	CLO 1-6 – GE/ILO 1,3	Assessed with Spring 2013 sections.
	MA 100	CLO 1-5 – GE/ILO 1,3	<i>No assessment data available.</i>
	MA 105	CLO 1-5 – GE/ILO 1,3	Assessed with Spring 2013 sections.
	MA 101	CLO 1-5 – GE/ILO 1,3	Sixteen students were evaluated. Most of the students did not performed at the proficiency level for CLOs 1-5. Suggested actions for improvement as follows: adding more measuring tools to allow more practice on precision tools, all students must take a basic math course or review how to solve percents, decimals, fractions, and ratio and proportion before enrolling in this course, and develop videos or DVD's to help students understand the operating principle of automotive components.
	MA 110	CLO 1-5 – GE/ILO 1 CLO 6 – GE/ILO 3	Eleven students were evaluated and they performed at the proficiency level above 70% for CLOs 1 and 4. For CLO 2, 3, 5, and 6, the expected proficiency level was not met. Some students had difficulty with geometry concepts so need to review these concepts well, some students didn't use the correct financial formulas and were confused with combinations/ permutations. – need to discuss these more with students in more detail and show better examples of each.
	MA 111	CLO 1-3 – GE/ILO 3	Eight students were evaluated and they performed at the proficiency level above 70% for CLOs 1, 3, and 4. However, for

		CLO 4-6 – GE/ILO 1	CLOs 2 and 5, the expected proficiency level was not met so more exercises and time is needed to strengthen students' knowledge on operations on functions as well as solving system of equations using different methods, more specifically matrices.
	MA 112	CLO 1-2 – GE/ILO 3 CLO 3-4 – GE/ILO 1	Two students were evaluated and they performed at the proficiency level above 70% for all CLOs 1 to 4. The proficiency level was met and no further action needed at this time.
Spring 2013	MA 95	CLO 1-6 – GE/ILO 1,3	Forty students were evaluated and they performed at the proficiency level above 70%. The proficiency level was met and no further action needed at this time.
	MA 100	CLO 1-5 – GE/ILO 1,3	Seven students were evaluated and they performed at the proficiency level above 70%. The proficiency level was met and no further action needed at this time.
	MA 105	CLO 1-5 – GE/ILO 1,3	Forty students were evaluated and they performed at the proficiency level above 70%. The proficiency level was met and no further action needed at this time.
	MA 111	CLO 1-3 – GE/ILO 3 CLO 4-6 – GE/ILO 1	Thirty students were evaluated and they performed at the proficiency level above 70% for CLOs 1 to 4. However, the students assessed did not reached proficiency level for CLO5, so more time is needed to help students better understand the use of matrices to solve system of equations.
	MA 121	CLO 1,4,6,7 – GE/ILO 3 CLO 2,3,5 – GE/ILO 1	Eight students were evaluated and they performed at the proficiency level above 70% for CLOs 3, 5, and 6. For CLO1, need to review terminology in more details for the comprehensive exams. For CLO2, some of the questions in the test were confusing so need to rewrite. For CLO4, most students scored below 70% due to confusion between independent and mutually exclusive events so need to elaborate more on these concepts.
	MA 211	CLO 1-10 – GE/ILO 1,3	Course was offered but not accessed.
Summer 2013			MA 95, MA 105, and MA 110 were offered but not assessed.

Year 2: School Year: Fall 2013 – Summer 2014

Semester Assessed	Course Assessed	CLO – GE/ILO Alignment	Results of Assessments
Fall 2013	M 95	CLO 1-6 – GE/ILO 1,3	Assessed with Spring 2014 sections.
	MA 100	CLO 1-5 – GE/ILO 1,3	No data available
	MA 101	CLO 1-5 – GE/ILO 1,3	No data available
	MA 105	CLO 1-5 – GE/ILO 1,3	Assessed with Spring 2014 sections.
	MA 110	CLO 1-5 – GE/ILO 1 CLO 6 – GE/ILO 3	Nineteen students were evaluated and the proficiency level for all CLOs was not met. For CLO1, try more practice/ discussions on problem solving strategies. For CLO 2, some students have weak basic math and algebra skills that cannot be addressed in this class. For CLO3 and 4, Geometry is weak for students. Need to review/ reinforce the basics. For CLO6-Most

			of the students were confused with the financial formulas due to their weak algebra skills.
	MA 111	CLO 1-3 – GE/ILO 3 CLO 4-6 – GE/ILO 1	Students were evaluated and they met the proficiency level for all CLOs except CLO 1, 4, and 5. There are many factors that contributed to these results. First, most students still have weak understanding of basic concepts in algebra that is needed at this course level. Second, because students lack the basic skills and knowledge of concepts, they tend to spend more time re-learning the basics and less time is spent on the current lesson.
Spring 2014	MA 95	CLO 1-6 – GE/ILO 1,3	Students were evaluated and they performed at the proficiency level above 70%. Continue to offer and assess the course and make changes as necessary.
	MA 100	CLO 1-5 – GE/ILO 1,3	No data available
	MA 105	CLO 1-5 – GE/ILO 1,3	Fifty-five students were evaluated and they performed at the proficiency level above 70%. The proficiency levels were met and no further action needed at this time.
	MA 111	CLO 1-3 – GE/ILO 3 CLO 4-6 – GE/ILO 1	Eight students were evaluated and they performed at the proficiency level above 70% for CLOs 1 to 4. However, students assessed did not reach the proficiency level for CLO5, and so more time is needed to help students better understand the use of matrices to solve systems of equations.
	MA 121	CLO 1,4,6,7 – GE/ILO 3 CLO 2,3,5 – GE/ILO 1	Sixteen students were evaluated and they performed at the proficiency level above 70% for CLOs 2. For CLO 1, need to review terminology in more details for the exams. Remind students to READ! For CLO3, some students made errors with bivariate tables. Remind them to study the tables carefully. For CLO4, some students were confused when to use table or formulas values. Need to elaborate on the differences. For CLO5 and CLO 6, some students had weak algebra skills and can't work with functions.
	MA 211	CLO 1-10 – GE/ILO 1,3	Two students were evaluated and they performed at the proficiency level above 70% for CLOs 1 and 2 only. For the remaining CLOs 3-10, the students were not doing the required readings. Plan to tie-in readings and activities with reflective writing assignment.
Summer 2014			MA 95, MA 100, MA 101, MA 105, MA 110, MA 111, MA 112 were offered but not assessed.

Year 3: School Year: Fall 2014 – Summer 2015

Semester Assessed	Course Assessed	CLO – GE/ILO Alignment	Results of Assessments
Fall 2014	MA 95	CLO 1-6 – GE/ILO 1,3	Students were evaluated and they performed at the proficiency level above 70%. Continue to offer and assess the course and make changes as necessary.
	MA 100	CLO 1-5 – GE/ILO 1,3	Ten students were evaluated and they met the proficiency level for all CLOs except CLOs 1 and 4. Students had difficulty in solving fractions for CLO 1 so will try Bar Modeling approach when teaching fractions and more drills for measuring tools for CLO 4.
	MA 101	CLO 1-5 – GE/ILO 1,3	For CLO 1, establish a basic math test in the first day of class - students who don't have sufficient skills in basic math will use the LRC department to help them to review their basic math skills. For CLO 3, help the students to practice using precision tools outside of class.
	MA 105	CLO 1-5 – GE/ILO 1,3	No data available.
	MA 110	CLO 1-5 – GE/ILO 1 CLO 6 – GE/ILO 3	Fourteen students were evaluated and they met the proficiency level for all CLOs except CLO 4, 5, and 6. For CLO4 and CLO 5, geometry is weak for students so need to review/ reinforce the basics. For CLO6, most of the students were confused with the financial formulas due to their weak math skills. Will prepare a handout to summarize all the formulas in categories. This might help them to distinguish the differences between the formulas.
	MA 111	CLO 1-3 – GE/ILO 3 CLO 4-6 – GE/ILO 1	Students were evaluated and they met the proficiency level for all CLOs. No specific action taken at this time.
	MA 112	CLO 1-3 – GE/ILO 3 CLO 4-6 – GE/ILO 1	Two students were evaluated and they met the proficiency level for all CLOs. No specific action taken at this time.
Spring 2015	MA 95	CLO 1-6 – GE/ILO 1,3	Students were evaluated and most of the students assessed performed at proficiency level for all CLOs. No necessary action at this time.
	MA 100	CLO 1-5 – GE/ILO 1,3	Five students were evaluated and the students performed at the competent level for CLOs 1-4 except CLO 5. For CLO 5, students had difficulty in estimating. Bar Modeling approach and more hands on activities in estimating will be given to students.
	MA 105	CLO 1-5 – GE/ILO 1,3	Students were evaluated and most of the students assessed performed at proficiency level for all CLOs. No necessary action at this time. Instructor should continuously use effective measures of instruction to achieve all learning objectives at proficiency level.
	MA 111	CLO 1-3 – GE/ILO 3 CLO 4-6 – GE/ILO 1	Students were evaluated and 100% of students assessed performed at proficiency level for all CLOs. Continue to offer and assess the course and make necessary changes.
	MA 121	CLO 1,4,6,7 – GE/ILO 3 CLO 2,3,5 –	Twenty six students were evaluated and the students performed at the proficiency level for CLOs 2-6 except CLO 1 at 62%. In reference to CLO 1, there is a significant improvement from last

		GE/ILO 1	time (25%). Will continue with detailed review for chapter 1 and add a quiz before the chapter test.
	MA 211	CLO 1-10 – GE/ILO 1,3	Three students were evaluated and the students performed at the competent level for all CLOs except CLO 1, 3, 5, 6 at 67% and CLO 7 and 10 at 33%. Students are not reading/reviewing the concepts well. Concepts review quiz will be given as well as more emphasis on modeling and more explicit review of type of graphs and what each type is used for either discrete or continuous data.
Summer 2015			MA 95, MA 105, MA 111, MA 157 were offered but not assessed

5.0 Evaluation of Previous Program Review Action Plans

Indicate the status of the previous program review action plans

Action Plan Activity/Objectives	Status Complete/Ongoing/ Incomplete	Remarks
Attend seminar/trainings/workshop/conference relevant to mathematics for technologies	Incomplete	The plan was never materialized due to limited or lack of funding.
Attend seminar/trainings/workshop/conference relevant to strategies/methodologies in teaching mathematics	Complete	One instructor went to the Pacific Education Conference (PEC) in the summers of 2013 and 2015. Depending on the availability of funding opportunities, other instructors should attend conferences as well.
Hire one full-time mathematics instructor	Complete/As of Summer 2015 - Incomplete	A full-time instructor was hired but resigned in Summer 2014. A replacement was hired in Fall 2014. However, due to health reasons, the instructor resigned Spring 2015. Thus, a full-time instructor needs to be hired as soon as possible.
Hire two full-time assistant instructors to assist in MA95 lab.	Incomplete	The plan was never materialized due to limited or lack of funding.
Prepare updated standardized tests for college level math courses	Ongoing	Standardized tests and signature assignments have been created for most of the courses including MA 95, MA 100, MA 101, MA 105 and MA 111 to ensure a cohesive tool of measurement to use to assess courses.
Create MA102 course for General Electronics (GE), Electrical Technology (ET), and Refrigeration & Air-Conditioning (AC).	Complete	This planned course was completed by the Electrical Technology (ET) Department. The course was assigned to the ET program as ET 102.
Conduct monthly departmental meetings	Ongoing	Monthly faculty meetings as necessary for instructors to share any changes/modifications they see fit to improve course learning outcomes. This will also ensure constant communication between faculties for improvement of courses and student learning.

6.0 Action Plan

Based on this department review results, describe the department action plan for the next three (3) academic years. Include necessary resources.

Action Plan Activity/Objectives	How will this action plan improve student learning outcomes? (CLO, GE/ILO)	Needed Resources (if any)	Timeline
Hire a full time math instructor	Hiring another qualified math instructor will ensure that students are learning proper concepts that will carry them to next level math courses. Hiring assistant math instructor will ensure manpower to manage and maintain the lab component of courses as well as to strengthen what is taught in the classroom.	Funding	Spring 2016
Create and maintain a Math Lab	Math Lab will be used to enhance especially those math courses that have a lab component. The space will also be used for tutoring and other activities which will strengthen instruction.	Office space and funding	Fall 2016
Conduct monthly faculty meetings	Continue to conduct monthly meetings as necessary for instructors to share any changes/modifications they see fit to improve course learning outcomes. This plan will also ensure constant communication between faculties for improvement of courses and student learning.	None	Ongoing
Continuous review and update of CLOs and other necessary related documents	Continue to review and update course learning outlines to ensure better alignment between what is taught in the classroom and what is student evaluated on. The plan will also make sure consistent and updated alignment of CLOs to GE PLOs to ILOs.	None	Ongoing
Faculty development	Participate in professional development for instructors and assistant instructors. The plan will ensure instructors are up-to-date on the latest teaching techniques and relevant information for improvement of student learning.	Funding	Ongoing
Facilities	Continue to assess and make necessary improvement to classrooms to ensure conducive learning environment for both faculties and students.	Funding	Ongoing

7.0 Resource Requests

Type of Resource	Description	Estimated Amount Requested	Justification
Personnel	<ul style="list-style-type: none"> 1 full time instructor 1 full time assistant instructor 	<ul style="list-style-type: none"> \$21,000.00 \$17,000.00 	<ul style="list-style-type: none"> To teach math courses full time. To assist full time instructors by providing services and maintaining the math lab.
Facilities	<ul style="list-style-type: none"> Room 51 Room 52 Room 69 Office Space 	<ul style="list-style-type: none"> \$700.00 \$2,000.00 \$1,500.00 \$7,500.00 	<ul style="list-style-type: none"> Still incomplete -Need to replace both chalkboards with whiteboards. Classroom ceiling is leaking and needs to be repaired. Still incomplete -Need to replace old broken student desks/chairs with 25 sturdy ones. Replace chalkboard with whiteboard. To create a Math Lab which will be used to enhance/support math courses with a lab component. The space will also be used for tutoring and other activities which will strengthen instruction.
Equipment	<ul style="list-style-type: none"> Analog Circuit-Voltage testers (25 each class x 2) Calipers (slide vernier/dial vernier/ electronic vernier) (25 each class x 2) Micrometer (outside/depth) (25 each class x 2) Desktop Computers (10) 	<ul style="list-style-type: none"> \$800.00 \$2,000.00 \$2,000.00 \$10,000.00 	<ul style="list-style-type: none"> To enhance instruction, especially in applications of concepts, for MA 100 (Technical Math) and MA 101 (Math for Mechanics). To provide and enhance instruction for MA 100 and MA 101. Replacement for old and broken instruments/equipment. To provide and enhance instruction for MA 100 and MA101. To equip the Math Lab to enable the use of math software for tutoring and electronic math assessments.
Supplies	<ul style="list-style-type: none"> Office Supplies 	<ul style="list-style-type: none"> \$500.00 (annually) 	<ul style="list-style-type: none"> To provide and enhance daily instruction as well as enable instructors to complete other duties such as writing reports, assessments, placement tests, etc.
Software	<ul style="list-style-type: none"> Math Software for tutoring and instructional use 	<ul style="list-style-type: none"> \$2,000.00 	<ul style="list-style-type: none"> To provide and enhance services for remedial courses outside of the classroom as well as to enhance instruction in the classroom.
Training	<ul style="list-style-type: none"> Trainings/Workshops/Conferences such as NCTM 	<ul style="list-style-type: none"> \$4,500.00 per faculty 	<ul style="list-style-type: none"> To enhance and update instructor's skills and understanding of the subject matter, especially in methodologies.

Appendix B: Provide Department Learning Outcomes (PLOs)

Palau Community College Mathematics Department General Education Learning Outcomes

During the program experience, the **Program Learning Outcomes** (PLOs) will be assessed through the use of signature assignments of course learning outcomes which are aligned with the PLOs. A rating scale will be used to determine the students' proficiency level of each PLO using specifically aligned assignments. The numerical ratings of 4, 3, 2 and 1 are not intended to represent the traditional school grading system of A, B, C, D and F. The descriptions associated with each of the numbers focus on the level of student performance for each of the course learning outcomes listed below.

Rating Scale:

- 4 ----- **Highly Competent**
- 3 ----- **Competent**
- 2 ----- **Approaching Competency**
- 1 ----- **Limited/No Competency**

Competency #1: Communicate mathematical ideas effectively either orally or in writing.

Numerical Value	Performance Criteria
4	Demonstrate mastery of the above concepts with no arithmetic error.
3	Demonstrate good understanding of the above concepts with minor arithmetic error.
2	Demonstrate basic understanding of the above concepts but with significant conceptual and/or arithmetic error.
1	Demonstrate major gaps in or no understanding of the above concepts.

Competency #2: Analyze and solve mathematical problem in their related field.

Numerical Value	Performance Criteria
4	Demonstrate mastery of the above concepts with no arithmetic error.
3	Demonstrate good understanding of the above concepts with minor arithmetic error.
2	Demonstrate basic understanding of the above concepts but with significant conceptual and/or arithmetic error.
1	Demonstrate major gaps in or no understanding of the above concepts.

Competency #3: Demonstrate ability in precise and accurate skills in mathematical computation.

Numerical Value	Performance Criteria
4	Demonstrate mastery of the above concepts with no arithmetic error.
3	Demonstrate good understanding of the above concepts with minor arithmetic error.
2	Demonstrate basic understanding of the above concepts but with significant conceptual and/or arithmetic error.
1	Demonstrate major gaps in or no understanding of the above concepts.

Appendix C: Department mapping that shows alignment of CLOs – GE/ ILOs

Course	PLO 1 (Critical Thinking and Problem Solving) Students who complete the General Education Program can analyze and solve problems by using judgment based in evidence, sound reasoning and/or creativity to differentiate facts from opinions and to specify solutions and their consequences.	PLO 2 (Communication) Students who complete the General Education Program can effectively communicate, both orally, and in writing, thoughts in clear, well organized manner to persuade, inform and/or convey ideas in academic, work, family and community setting.	PLO 3 (Quantitative and Technological Competence) Students who complete General Education Program can use mathematical skills appropriate to our technological society by analyzing and solving problems that are quantitative in nature and by utilizing technology for informational, academic, personal and professional needs.	PLO 4 (Diversity) Students who complete the General Education Program can distinguish and defend differences in culture and behaviors between oneself and others by demonstrating respect, honesty, fairness, and ethical principles in both personal and professional life.	PLO 5 (Aesthetics) Students who complete the General Education Program can apply numerous means by inquiry to experience and appreciate the values of arts and nature.	<i>Institutional Learning Outcomes (ILOs)</i>
MA 95	CLO 1 – 6		CLO 1 – 3			<i>ILO 1, 3</i>
MA 100	CLO 1 – 5		CLO 1 – 5			<i>ILO 1, 3</i>
MA 101	CLO 1 – 5		CLO 1 – 5			<i>ILO 1, 3</i>
MA 105	CLO 1 – 5		CLO 1 – 5			<i>ILO 1, 3</i>
MA 110	CLO 1 – 5		CLO 6			<i>ILO 1, 3</i>
MA 111	CLO 4 – 6		CLO 1 – 3			<i>ILO 1, 3</i>
MA 112	CLO 3 – 4		CLO 1 – 2			<i>ILO 1, 3</i>
MA 121	CLO 2, 3, 5		CLO 1, 4, 6			<i>ILO 1, 3</i>
MA 157	CLO 1-4	CLO 1-4	CLO 1-4			<i>ILO 1-3</i>
MA 211	CLO 1 – 10		CLO 1 – 10			<i>ILO 1, 3</i>
MA 221	CLO 2 – 4		CLO 1			<i>ILO 1, 3</i>

Appendix D: Provide signature assignment form***MATH DEPARTMENT***

Course Number:	Course Title:	Semester Credit:	Signature Assignments:
MA 95	Basic algebra	3 (2 lec/1 lab)	➤ Midterm exam ➤ Final exam
MA 100	Technical mathematics	3	➤ Midterm exam ➤ Final exam ➤ Practical application (skills test)
MA 101	Math for mechanics	3	➤ Midterm exam ➤ Final exam ➤ Practical application (skills test)
MA 105	Intermediate algebra	3	➤ Midterm exam ➤ Final exam
MA 110	Survey of mathematics	3	➤ Midterm exam ➤ Final exam
MA 111	College algebra	3	➤ Midterm exam ➤ Final exam
MA 112	Trigonometry	3	➤ Midterm exam ➤ Final exam
MA 121	Elementary statistics	3	➤ Midterm exam ➤ Final exam
MA 157	Mathematics and Numeracy Teaching	3	➤ Microteaching presentation ➤ Investigative task and assessment rubric ➤ Visual diary and personal reflection paper
MA 211	Mathematics for elementary teachers	3 (2 lec/1 lab)	➤ Midterm exam ➤ Final exam
MA 221	Calculus I	5	➤ Midterm exam ➤ Final exam