

## Department meeting template Learning Outcomes

**Department:**

<b>Mathematics and Physical Science Department</b>
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**Date:**

<b>Sep 8, 2020</b>
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**Department PLOsSAOs (these will be provided to you from your Assessment Coordinator)**

PLO #	PLO	Where in the program is it assessed?
1	PLO 1: Express mathematical concepts accurately and concisely in numerical and spoken language	Math1, Math50, Math13, Math3A, Math3B, Math 213, Math 203
2	PLO 2: Apply mathematical concepts to concrete and abstract problems, and draw logical conclusions using the logic, and inductive and deductive reasoning	Math1, Math50, Math3A, Math3B, Math 213, Math 203, Math 13, Math 213
3	PLO 3: Master the relevant mathematical concepts as listed in the course outlines, which will enable them to take subsequent courses of increasing complexity.	Math1, Math50, Math13, Math3A, Math3B, Math 213, Math 203

**Summarize results of last semesters assessment: (for large departments pick 3-5 most relevant)**

SAO/SLO/PLO	Where and when was it assessed?	Outcome/Action Plans/Results
PLO 1: Express mathematical concepts accurately and concisely in numerical and spoken language	<p>Math 1 (using SLO # 1 and #3), and Math 13 (using SLO #1)</p> <p>We used the result from the 2019-2020 Math 1 class which emphasized the numerical and spoken language that fall within the topic of a different type of functions (linear, quadratic, polynomial, exponential, logarithmic function). These topics were highlighted to support students to use mathematical languages and terminologies accurately.</p> <p>Also, we used the result from 2019-2020 Math 13, and 213 classes that used statistical</p>	<p>Students in these classes expressed mathematical concepts accurately and verbally. Students became comfortable with mathematical sentences, as they learned mathematical concepts and how to express them. The results were determined that students were able to use the mathematical languages adequately such as domain, range, transformation, ends behavior, asymptotes, origin. etc., in each topic of the course and were able to explain the concept using math symbols. The results were also determined that teachers and students communicated mathematical ideas among themselves, and the course aimed to communicate mathematical concepts with precision and unambiguity. Challenges included mathematical writing with a concise expression of math and statistical ideas. These challenges can be resolved with an embedded tutor and supplemental instructions.</p>

	terminology and notations.	
PLO 2: Apply mathematical concepts to concrete and abstract problems, and draw logical conclusions using the logic, and inductive and deductive reasoning	Math 1 (using SLO # 1 and #3), Math 13 (using SLO #3), Math 3A (SLO #3), 3B (SLO #4), and Math 50 (SLO #1, 2) We used the result from the 2019-2020 Math 1, 13, 213, 3A, 3B, 3C, 50 classes which emphasized the mathematical reasoning skills that fall within inductive and deductive reasoning.	Students in these classes successfully applied mathematical concepts to concrete and abstract problems. The results were determined that students were able to look for patterns, make educated guesses, generate hypotheses, form generalization, and use the logic based on the inductive and deductive reasoning. The results were determined that students were able to examine data and to generalize to formulate conjectures. The results also determined that students were able to analyze mathematical sentences, develop mathematical skills, and draw conclusions from them (deductive and inductive reasoning). To meet the needs of AB 705, more embedded tutors were needed to support the course, Math 13+213. To recruit tutors, the learning center and embedded program may require professional development for both tutors and faculty.

## **Discussion**

1. Overall, how are students doing in the department/program? What are the strengths and weaknesses identified through assessments? What are students struggling with?

Overall, the math and physical science department continues to have high fill rates and productivity across math and physics courses. All areas have seen an increase in degree and transfers. Since the beginning fall 2015, many more students have been placed into transfer-level math courses, Statistics (Math 13 and 213) under AB 705. These new courses (Math 13 and 213) allowed all students entry into transfer-level courses while increasing success and completing it at the same time. According to the data, [\*Enrollment and Completion Trends in Introductory Transfer Level \(ITL\) in Math 1, 13, and 213\*](#) by Nathan Pellegrin, the math and physical science department has several outcomes:

- The number of students taking ITL math increased by 17%, from the academic year 2018 2019 to 2019-2020,
- The success rate in ITL math courses increased from 68.4% to 84.1%, from summer 2018 to summer 2019,
- The success rate in ITL math courses decreased from 59.9% to 57.7%, from fall 2018 to fall 2019
- The success rate in ITL math courses increased from 59.8% to 85.3%, from spring 2018 to spring 2019,
- The success rate among students taking ITL math as their first math course increased from 57.1% to 83.7%, from spring 2018 to spring 2019,
- The number completing ITL math within one year increased by 99%, from fall 2018 to fall 2019
- Among Hispanic students, the number completing ITL Math within one year has increased by almost 50% over the last two years.

There are several challenges that students are facing in the department: lack of support for tutoring and supplemental instruction, and a lack of financial support for equipment and repair of equipment.

2. What skills and resources are needed to address gaps in learning /services?

According to the data, *Enrollment and Completion Trends in Introductory Transfer Level (ITL) in Math 1, 13, and 213* by Nathan Pellegrin, there was a large population of Hispanic students who completed ITL math within one year of enrolling in math for the first time, however, African American students have significantly lower completing rates in ITL math within one year of enrolling in math for the first time. To increase the achievement level of minority and low-income students, our department needs to focus on high standards, learning center services, supplemental instructions, and professional development.

3. Are the SAOs/PLOs and SLOs relevant and appropriate for the course/dept/programs? If not, what should be changed?

Overall, the SLOs and PLOs in the math and physical science department are aligned with the curriculum. Students' cumulative learning outcomes (SLOs) in all math and physics courses have been consistent with the curriculum. Furthermore, our department understands that our institution has been committed to the educational needs of the diverse community and students' population. Thus, PLOs in the math physical science department needs to ensure that equity is included in program learning plans, goals, and activities. To support students' success and equity, our department needs to emphasize the students' equity gap and provides diverse teaching instructions.

4. How do your results align with our ILOs (listed below)?

The PLOs in our department are aligned with the ILOs. For example, the ITL courses (Math1, 13 and 213) under AB 705 were developed to prepare students to meet the mathematical thinking and problem solving of higher education courses and workplace requirements. Through the courses, students can have deepened conceptual understandings of mathematical ideas, skills, and strategies (*ILO #critical thinking and ILO #quantitative reasoning*). Students are also able to master the mathematical contents and tasks to transfer their skills to career pathways. For example, working effectively in groups enables students to make decisions and to solve real-world problems. Through collaboration, students can understand how mathematical knowledge can be related to common values of diverse languages and cultures (*ILO #cultural awareness*).

5. What are the plans for assessment next semester?

SLO/PLO to be assessed	Who will assess?	Where?
PLO #1	Physics instructor	Physics 2A, 2B, 10, 4A

**Merritt College ILOs:****COMMUNICATION**

Communicate with clarity and precision using oral, nonverbal, and/or written language, expressing an awareness of audience, situation, and purpose.

**CRITICAL THINKING**

Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.

**QUANTITATIVE REASONING**

Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

**CULTURAL AWARENESS**

Through a knowledge of history and cultural diversity, recognize and value perspectives and contributions that persons of diverse backgrounds bring to multicultural settings and respond constructively to issues that arise out of human diversity on both the local and the global level.

**CIVIC ENGAGEMENT AND ETHICS**

Internalize and exhibit ethical values and behaviors that address self-respect and respect for others with integrity and honesty that will enable success and participation in the larger society.

**INFORMATION AND COMPUTER LITERACY**

Use appropriate technology to identify, locate, evaluate and present information for personal, educational and workplace goals.