

Unit Assessment Report - Four Column

Foothill College

Program (PSME - MATH) - Mathematics AS

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
<p>Program (PSME - MATH) - Mathematics AS</p> <p>- 1 - Students completing their math program at Foothill College will be able to clearly communicate mathematical ideas through graphs, tables of data, equations, and verbal descriptions.</p> <p>Year PL-SLO implemented: 2011-2012</p> <p>SLO Status: Active</p>	<p>Assessment Method: Instructor-generated research assignment will be given in one of the Math 2A classes during the winter quarter of 2012. The assignment will be graded using a qualitative rubric.</p> <p>Assessment Method Type: Research Paper</p> <p>Target: 70% of the students will earn a "C" grade or better on the assignment.</p> <p>Related Documents: AS math P-SLO assessment prompt</p>	<p>04/16/2012 - Of the 26 students registered in the course at the time of the assessment, 23 completed the assessment on time with a grade of C or better. One student later completed the assessment satisfactorily, and two students failed to complete the assessment.</p> <p>Result: Target Met</p> <p>Year This Assessment Occurred: 2011-2012</p> <p>Resource Request: XXX</p> <p>GE/IL-SLO Reflection: XXXX</p>	<p>04/16/2012 - Although Differential Equations is not strictly required as part of this program, the AA in Math is almost never a terminal degree, virtually all who earn it transfer to a Bachelor's program at university. As a result, students in this program must take this class, either here or at much higher cost after transfer, so it's safe to say that students in this program take this class at or near the end of their studies here.</p> <p>The assessment prompt demands an in-depth investigation into the settling time of a mechanical system. There are several appropriate ways to proceed, but at some point, equation-solving techniques, graphing, and numerical investigations are required, as the program-level outcome demands. Finally, students are prompted to describe insights they gain into the unexpectedly complex settling-time phenomenon, directly meeting the program-level outcome's communication requirement.</p> <p>Even though all the papers submitted were acceptable overall, there were two canonical errors. The key insight the prompt should lead students to is that settling time is a discontinuous function of the friction present in the mechanical system. Eleven students missed</p>

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			<p>that insight, in two different ways.</p> <p>Seven students made a perfectly reasonable approximation that greatly simplifies the mathematical work and gives very good numerical results (they used a decaying exponential to approximate the product of the exponential and a sinusoid). But using that approximation has two consequences that diminish the quality of the analysis: it smooths over the very subtle behavior that leads to the discontinuities, and it leads to the result that seems obvious at the outset but is actually incorrect, that settling time is minimized by so-called "critical" friction. (The counterintuitive fact that sub-critical friction minimizes settling time gives the prompt much of its richness and usefulness in assessing the program-level outcome.) These seven papers earned grades of B or B-.</p> <p>The other four students simply did not look closely enough to discover the discontinuities. On a rough scale, settling time seems to decrease smoothly with increasing friction, heading toward a minimum near the critical value, as anticipated. By not looking closely enough (i.e., by not doing enough work), they missed the key insight. These four papers earned grades of C or C+.</p> <p>Aside from the canonical errors,</p>

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			<p>there were other shortcomings in the student responses to the prompt, typically in the communication that the outcome demands. From the errors and shortcomings, I can see the need to rephrase part of the prompt to emphasize things a bit differently, to at least hint that there is more going on than one might expect, to prompt all students to investigate settling time deeply, and to describe clearly what they find.</p> <p>In future assessment cycles, I believe it also appropriate to assess program-level outcomes in other classes like Linear Algebra, and Multivariable and Vector Calculus.</p>
		<p>12/04/2011 - No Assessments given as of Fall 2011, so the target can't be classified as being met or not met. Result: Target Met Year This Assessment Occurred: 2011-2012</p>	
Program (PSME - MATH) - Mathematics AS - 2 - Students completing their math program at Foothill College will be able to construct appropriate mathematical models of natural phenomena, develop those models with appropriate mathematical techniques, and interpret results of those models	<p>Assessment Method: Common assessments given at the end of all terminal classes. These questions will be given to all sections of the course. Assessment Method Type: Departmental Questions Target: 70% Success.</p>	<p>12/04/2011 - No Assessments given as of Fall 2011, so the target can't be classified as being met or not met. Result: Target Met Year This Assessment Occurred: 2011-2012</p>	

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