



Student Learning Assessment Report (SLAR)

Instructions: This template is a running document of each annual Academic Program Assessment Report due to the department chairs and Provost the last Friday in October. The final report in the document should be the official report of the year of the full Program Review. All reports below use the same report template. If the report is the Program Review year, please indicate it next to "Program Review Year" and also submit the Academic Program Review (APR).

Department: Natural And Applied Sciences

Academic Program Evaluated: Applied Mathematics

Program Review Year: 2019-2020

	Year 1 Academic Year: 2016-2017	Year 2 Academic Year: 2017-2018	Year 3 Academic Year: 2018-2019	Year 4 Academic Year: 2019-2020
Faculty members involved in this assessment process: <small>(List all faculty members who participated: program coordinator, reviewers, committee members, etc.)</small>	1. Don Tosh, Professor of Mathematics Artifact Assessor 2. Dianne Twigger, Assistant Professor of Mathematics Artifact Assessor		3. Don Tosh, Professor of Mathematics Artifact Assessor 4. Dianne Twigger, Assistant Professor of Mathematics Artifact Assessor 5. Michelle Parker, Adjunct Professor of Mathematics Artifact Assessor	
Number of students in	Freshmen: 0	Freshmen:	Freshmen: 1	Freshmen:

<p>sample: (If known, supply the number of students in each class/year who were used in the assessment report.)</p>	<p>Sophomores: 5 Juniors: 4 Seniors: 4 Graduate: 0</p>	<p>Sophomores: Juniors: Seniors: Graduate:</p>	<p>Sophomores: 2 Juniors: 0 Seniors: 1 Graduate: 0</p>	<p>Sophomores: Juniors: Seniors: Graduate:</p>
<p>Instrument(s) used in assessment: (List the exams, standardized tests, portfolios, etc. that were used in the assessment process.)</p>	<p>1. Exam; Differential Equations 2. Quiz; Calculus III 3. Exam; Calculus II 4. Homework; Calculus II 5. Quiz; Calculus III 6. Exam 3; Linear Algebra 7. Homework; Differential Equations</p>		<p>1. Hypothesis test homework assignment Math 210 (Elementary Statistics) 2. Curve Sketching Assignment Math 231 (Calculus 1) 3. Integration Techniques Quiz Math 232 (Calculus 2) 4. Second order ODE exam Math 431 (Differential Equations) 5. Second Order ODE homework assignment Math 431 (Differential Equations) 6. SPSS assignment Math 210 (Elementary Statistics) 7. Bisection Programming Math 432 (Numerical Analysis)</p>	

			8. Summary Statistics Quiz Math 210 (Elementary Statistics) 9. Regression Assignment Math 210 (Elementary Statistics) 10. Optimization Assignment Math 231 (Calculus 1) 11. Mass and Volumes of Revolution Quiz Math 233 (Calculus 3) 12. First order ODE applications assignment Math 431 (Differential Equations)	
<i>Additional Data:</i> (List any additional information/data that informed this report.)				
Methodology: (Explain the method of data collection and the data analysis process.)	Outcomes were assessed using a variety of different instruments, in a variety of different classes. Mastery was set at three on a four point scale. For overall outcome results when a student had been assessed on multiple outcomes, the students highest score was recorded (this explains the		Using 4-point scale rubrics, assessors scored student work on instruments above in Course Commons. A score of 3 or higher indicates mastery, and if a student is assessed in multiple ways, the highest score prevailed	

	reduction in sample size when discussing overall results).			
Results of Assessment: (List the findings in summary format as narrative.)	Students are achieving mastery in two of the three outcomes. Currently we have not collected data for outcome 3 (Improve Technological Skills).		Students are achieving mastery in each of the four program level outcomes. Data collection in the major is becoming more common and is evidenced by the increased sample sizes.	
Data: (Provide the graphs, charts, etc. that were used to show data results. Do not include the actual data.)	<p>Results of Assessment (mean scores on a scale of 0-4; 3+ considered proficient)</p> <p>Students are assessed on four themes (Program Level Outcomes)</p> <ol style="list-style-type: none"> 1. Developing Problem Solving Skills (mean 3.25, n=32) 2. Model Real Life Phenomena (mean 3.53, n=38) 3. Improve technological skills (no data) 		<p>Results of Assessment (mean scores on a scale of 0-4; 3+ considered proficient)</p> <p>Students are assessed on four themes (Program Level Outcome)</p> <ol style="list-style-type: none"> 1. Develop Problem Solving Skills (mean 3.29, n=52) 2. Model Real Life Phenomena (mean 3.13, n=100) 3. Improve Technological Skills (mean 3.44 n=62) 	
Strengths: (From the findings, list the areas of strengths that currently exist in the academic program.)	Two of the three outcomes are currently assessed in multiple courses, using multiple instruments. This ensures that students have multiple exposures to important concepts in		Student sample size has increased dramatically from first assessments. All three program level outcomes yield results at or above the mastery level.	

	<p>mathematics. Average student scores were all near or above mastery level set in the outcome assessment plan. In addition, data shows that student scores improve as they progress through the program.</p>			
<p>Areas in need of improvement: (From the findings, list the areas of weakness(s) that currently exist in the academic program.)</p>	<p>Currently the only courses that assesses the outcome "Improve Technological Skills" is Math 432 Numerical Analysis, which is only taught every other year. We are considering other courses in which we can add a technological component to be assessed. Potential courses include Differential Equations and Linear Algebra. This would provide use with multiple assessment opportunities to address this outcome.</p>		<p>While Applied Mathematics has a significant scientific component, no physics, chemistry, or biology courses are assessed in this program. Biology and chemistry courses are assessed within their respective programs but since there is not a physics program at Evangel it is important for us to begin assessing this vital part of our degree.</p> <p>Students have difficulty in developing problem solving skills and modeling real life phenomena in Math 210 and Math 232. This is somewhat expected as these are gateway courses for their program and topics used in assessment provide data on one of the student's first</p>	

			experiences with higher level thinking. Math 210 and 232 are also taken by students who are not in the mathematics program and their values could be skewing the results.	
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Year 1:

Plans for improvement: (Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person
Include technological components to assess in various courses.	SP17 – Differential Equations FA 18 – Linear Algebra	Twigger and Tosh
Incorporate modeling component into other courses	FA 18 – Probability and Statistical Inference	Tosh
Compile assessment report at the end of each academic year	SP18	Twigger and Tosh

Year 1:

Improvements made: (List completed improvement plans and dates of actual implementation.)

If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date

Year 2:

Plans for improvement: (Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person

Year 2:

Improvements made: (List completed improvement plans and dates of actual implementation.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date

Year 3:

Plans for improvement: (Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person
Assess physics component of the applied mathematics program	Fall 2019	Tosh, Cook, and McCorcle.

All sections of course will incorporate outcomes and provide artifacts for specific topics.	Immediately	All instructors and professors of courses listed in curriculum map.
Further coverage on courses involving proof techniques to increase data	Fall 2019	Professors Tosh and Twigger

Year 3:

Improvements made: (List completed improvement plans and dates of actual implementation.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date
New technology components were added to Math 431 (Differential Equations) and Math 231 (Calculus 1)	2018-2019
Course Level Outcomes were standardized for each program course so that they can be assessed using rubrics in canvas starting in fall 2019. Utilizing rubrics on canvas will allow us to evaluate data from all instructors in a course.	Fall 2019
Three program level outcomes were generated for the science component of the applied mathematics degree. These will be implemented and assessed in Fall 2019 courses. The mathematics program level outcome titled "model real life phenomena" has been split into three outcomes related to the sciences.	Fall 2019

Year 4:

Plans for improvement: (Provide the improvement plan, when it will be implemented, and person who will administer the improvement plan.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Plan for Improvement	Timeline	Responsible Person

Year 4:

Improvements made: (List completed improvement plans and dates of actual implementation.)

*If an A.A. degree is part of this program, describe how the changes to this program affect the A.A. degree, if any.

Improvement Plan	Implementation Date