Report of Student Learning and Achievement
Concordia University Irvine
School of Arts and Sciences – Mathematics Program

For Academic Year:	2021-2022

School of Arts and Sciences Mission
Mathematics Program Purpose
The **School of Arts and Sciences** strives to educate its students within the multi-faceted context of the liberal arts. Firmly rooted in the Christian tradition of Concordia University Irvine, the School confidently and freely explores both the riches of the past and the knowledge of today. The School cultivates within all students a disciplined and coherent worldview to prepare them to be active and effective leaders in today's world. The **Mathematics Department** endeavors to develop students' numerical and analytical abilities to investigate, formulate, analyze and articulate solutions to problems within the discipline of mathematics.

Program Learning Outcomes (PLOs)
1. Clearly communicate mathematical concepts, vocabulary, and notation. (SI, WC, OC, CLF)
2. Write, critique, and interpret various forms of mathematical proofs. (SI, WC)
3. Calculate, apply, and synthesize core content (e.g., algebra, calculus, statistics) in mathematics. (QR, SK, CLF)
4. Utilize effective strategies in problem solving, including data analysis and multiple representations of mathematical ideas (i.e., visualization/graphs, symbolic notations, and numerical data). (SI, QR, SK)

Program Assessment Overview **Aligns with ULO: Christian Literacy & Faith**			
PLOs Assessed	**Evidence and Assessment Instrument**	**Performance Objectives (Targets/Criteria) Measures:**	**Results for Measures of Student Learning:**
Christian Literacy and Faith	MTH 313- Christian Mathematician Presentation	At least 75% achievement in all rubric areas	On the Christian mathematician video presentations, there was 68.75% success in achieving expectations, reflected by

			22 of the 32 scores as “met expectations” or “exceeds expectations.”
Christian Literacy and Faith	MTH 495- Final Paper (Mathematics, Faith & Vocation Paper)	At least 75% achievement in all rubric areas used	The MTH 495 Final Papers achieved the highest competency, with 100% of the scores showing meeting or exceeding expectations.
Christian Literacy and Faith	MTH 495- Personal Mission Statement	At least 75% achievement in all rubric areas	On the Personal Mission Statements, there was a 66.7% success in achieving expectations, reflected by 8 of the 12 scores as “met expectations” or “exceeds expectations.”

Program Assessment Results

2021-22 APLO DATA: Christian Literacy & Faith

Program: Mathematics

Total # of student artifacts assessed: 8

If artifacts were group projects, total # of students: _____

Note: total # of student artifacts assessed may differ from total # of scores, if multiple independent raters were used versus a consensus or single score.

Criteria	Number of Scores	Exceeds Expectations		Meets Expectations		Needs Improvement		Below Expectations		Meets or Exceeds	
		n	%	n	%	n	%	n	%	n	%
C1: Biblical Application (MTH 495 Final Papers)	11	3	27%	5	45%	3	27%	0	0%	8	73%
C2: Knowledge of key Christian doctrines (MTH 495 Final Papers)	12	5	42%	7	58%	0	0%	0	0%	12	100%
Knowledge of Christian ideas of vocation and (Pilot Rubric - MTH 313 Presentations)	32	2	6%	18	56%	11	34%	1	3%	20	63%
Knowledge of Christian ideas of vocation and (Pilot Rubric - MTH 495 Mission Statements)	12	4	33%	4	33%	0	0%	4	33%	8	67%

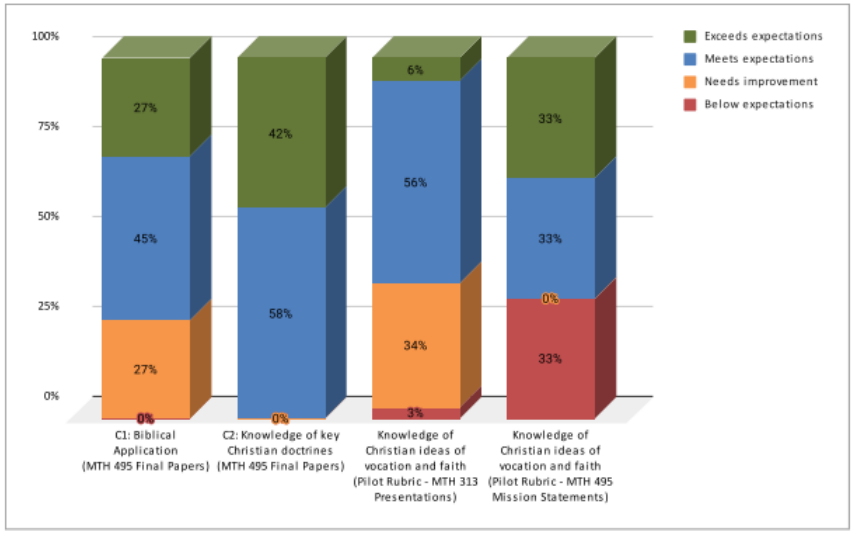
MTH 495 Final Papers (3 students, 4 graders, so 12 scores)

- C1: Biblical application
  - 8 met or exceeded standards
  - 3 scores reflect “Needs improvement”
  - 1 score reflected as “not applicable”
- C2: Knowledge of key Christian doctrines
  - 12 met or exceeded standards

MTH 313 Christian Mathematician Presentation videos (8 students, 4 graders, so 32 scores)
● Knowledge of Christian idea of vocations and faith
○ 22 met or exceeded standards
○ 11 scores reflect “Needs improvement”
○ 1 score reflects “Below Expectations”

MTH 495 Personal Mission Statements (3 students, 4 graders, so 12 scores)
● Knowledge of Christian idea of vocations and faith
○ 8 met or exceeded standards
○ 4 score reflect “Below Expectations”

Summary of Program Assessment Findings



This was the first time that we included these assignments within the mathematics major. Future considerations from these assessments include:
● For the MTH 313 presentations
○ This was the second time that these presentations were included in MTH 313.
○ Our plan is to introduce the students to the idea of Lutheran vocations by making a reading (or two) available. In particular, transfer students who haven’t taken INT 100 would benefit from this, but students who have been introduced to the ideas through INT 100, another course, or through their church would still benefit from reading an academic article about vocation before presenting on the life and vocations of a Christian mathematician.

○ Students sometimes struggled with finding a “Christian mathematician,” or if they did find one, the mathematician would be from the 1400-1600’s. To combat this, the department has started a list of mathematicians who were influential (both from that time period, and more modern mathematicians).
○ The department will work to modify the prompt for the videos, so students include a stronger focus on the role of faith and vocations in the mathematician’s life, and are encouraged to consider that role in their own lives.
● For the MTH 495 Mission Statement
○ This was the first time the mission statements were used as an assignment in MTH 495. The students overall did a great job of writing the mission statements, and including the ideas of vocations and faith into their statements.
○ The students wrote the mission statements, then they were collected several weeks later. In future MTH 495 courses, the statements will be collected when presented in class.
● For the MTH 495 Final Paper
○ Overall, students wrote papers which reflected their view of faith and vocations, and were able to connect those to their future career and vocations.
○ We will consider having the reading on Vocation from MTH 313 available to the students as well, as the students write their final papers.

Overall, the Mathematics Department was pleased with these results, and with the new rubric which we piloted for these assignments. We will continue to dialogue about them as a department, and find ways that students can connect, discuss and write about their faith and vocations.

Summary of Achievement Outcomes **Aligns with ULO: Christian Literacy & Faith**			
2021-2022 PLO Assessed	**Student Evidence: Final Papers**	**Student Evidence: Presentation**	**Student Evidence: Mission Statements**
Criterion Measured	**Performance Target Was…**	**Performance Target Was…**	**Performance Target Was…**
1. Biblical Application	Not Met	N/A	N/A
2. Knowledge of key Christian doctrines	Met	Not Met	Not Met
3. Understanding the distinction between biblical revelation and human reason, experience, or tradition	N/A	N/A	N/A
4. Familiarity with Christian History	N/A	N/A	N/A

Program Proposed Course of Action for Improvement in Learning Outcomes
The results were shared with the department members. The department will discuss the findings and continue to discuss changes and adaptations for future terms. With these results, the department will introduce and adopt future potential curricular changes. We believe that there should be a calibration of scores, since the four department members grade differently. We will plan on this before our next assessment report. Additionally, we will try to ensure that all work is graded anonymously, if possible. This is the first year that the department has used MTH 495 as a place to discuss ideas of Christian Literacy and Faith, and we will continue to use these assignments (readings about vocation, their personal mission statements and the final paper), adapting them as needed to give students more opportunities to discuss and think crucially about these connections.