

Program Outcomes Guide (POG)

Program Title: AS Mathematics Option

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Expected Program Learning Outcomes (PLO)

1. Use computational techniques and algebraic skills essential for success in an academic, personal, or workplace setting. (Computational and Algebraic Skills)
2. Use visualization, special reasoning, as well as geometric properties and strategies to model and solve problems. (Geometric Skills)
3. Compute probabilities and use results to analyze data and make inferences and predictions. (Statistical Skills)
4. Critically analyze and construct mathematical arguments. (Proof and Reasoning)
5. Use technology, where appropriate, to enhance and facilitate mathematical understanding, as well as an aid in solving problems and presenting solutions. (Technological Skills)
6. Communicate and Understand mathematical statements, ideas and results, both verbally and in writing, with the correct use of mathematical definitions, terminology and symbolism. (Communication Skills)
7. Work collaboratively with peers and instructors to acquire mathematical understanding and to formulate and solve problems and present solutions. (Collaborative Skills)

Assessment

- These outcomes are assessed through a series of course level assessments given to students in the courses required for the program, specifically MAT203, MAT204, MAT205, MAT206, MAT207, and MAT208. Assessment questions will each be linked back to a student learning outcome for that course and also to program learning outcome.
- Results on those questions will be stored in a database that will allow for thorough statistical analysis.

Validation

- These assessment questions are primarily chosen from sources for which a national benchmark can be attained. These sources include retired Praxis, SAT Subject, GRE Subject, and AP test questions. Each source has data available on the scoring of the questions on a national level that we can then use as a benchmark for our students.
- Several of the classes and outcomes do not lend themselves well to nationally benchmarked data. For example, there is no known source for nationally benchmarked questions for MAT208 – Linear Algebra or a national benchmark that would gauge the students' abilities to work cooperatively. For MAT208, C. Lewis collaborated with faculty at Hood College on a set of questions that both colleges would give to Linear Algebra students.
- For Outcome 7, in-house tools were used.

Results

	HCC Average Score	Benchmark Average Score
Program Outcome 1	48.6%	54.6%
Program Outcome 2	49.8%	49.6%
Program Outcome 3	58.3%	58.8%
Program Outcome 4	56.1%	56.8%
Program Outcome 5	77.3%	NA
Program Outcome 6	66.0%	62.9%
Program Outcome 7	97.5%	NA

- Outcomes 1, 2, 4, and 6 had many assessment items to contribute to these scores while Outcome 3 is addressed specifically in two courses and has fewer assessment items addressing it. Outcome 5 and 7 are addressed in every course, although few assessment items were included for this program assessment.
- Comparing the scores for HCC against the benchmark, we see that Program Outcome 1 is lower than the benchmark, while the rest are comparable to or above the benchmark value. One possible explanation for the lower score is that a higher percentage of the questions counting toward Program Outcome 1 are from MAT203 – Calculus 1, traditionally a class that keeps students from pursuing a degree in Math or Engineering. The scores for Program Outcomes 5 and 7 may also be inflated due to the lack of objectively designed assessment tools for these outcomes. Although, the students completing these collaborative assignments are very good students who have gotten to the level where they can complete upper-level mathematics courses.

Follow-up

- Adjustments are made to individual courses based on the assessment results at the course level.
- The department will continue partnerships with other local colleges to add assessment questions for some of the harder to assess courses, such as MAT 206 and MAT207.

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- The department will work together to determine an appropriate way to assess Outcomes 5 and 7, looking to ways to benchmark the assessment.

Budget Justification

- Improvements to the Learning Support Center so that students can quickly find the help that they need and that help is available for students of all levels.
- Continued upgrade of the MATLAB program to include the Symbolic Math Toolbox.
- Support the FLPTC recommendations for the sliding scale for numbers of students and number of preps for instructors. Teaching sections of upper-level mathematics classes can lead to lower numbers. Large enrollments in upper-level courses negatively affect individual student attention.