Mathematics MS

Emphasize Communication Skills

Goal Description:

The curriculum will provide students with opportunities to develop communication skills typically required of professionals in the area of study. Thesis students typically gain experience with written communication automatically as a part of the thesis writing process, and our non-thesis students will receive similar training as they create a written report with their research advisor. Moreover, our sequence of required courses that are not a part of the core now require writing intensive tasks throughout the four semesters that our students are enrolled. Oral communication skills are obtained in the taking of classes, in the teaching of classes, and in oral communication with other professionals about their work.

Providing Department: Mathematics MS

Progress: Ongoing

RELATED ITEMS/ELEMENTS -

RELATED ITEM LEVEL 1

Competence Teaching at the College Level

Learning Objective Description:

Prior to graduation, each student in the M.S. program should successfully complete at least one semester as a teaching assistant in the department. Our graduate T.A.'s are typically responsible for one freshman-level course in the core curriculum, like college algebra, plus one section of a corresponding co-requisite developmental course. This experience can help students who will later pursue a Ph.D. program and those who intend to teach at the college level after graduation.

RELATED ITEM LEVEL 2

Teaching Mentorship

Indicator Description:

Graduate students will observe faculty classes and report techniques to each other.

Criterion Description:

Because many of our MS students will either continue in doctoral programs (which require teaching as part of their graduate assistantships) or as instructors at 2-year schools, quality teacher training is a valuable component of our MS program. Almost all of our tenure-track mathematics faculty regularly experiment in their classrooms with evidence-based, innovative teaching techniques. This will be shared with graduate students, along with an examination of current literature on teaching methods for higher education.

Findings Description:

In Spring 24, students who are expected to teach in Fall 24 attended a class taught by one of our visiting faculty. These students wrote reflections on techniques they witnessed in that faculty member's class that they would like to implement themselves when they begin teaching. All of the students completed this assignment.

RELATED ITEM LEVEL 3

Action - Teaching Mentorship

Action Description:

In the 23/24 academic year, our teaching mentorship program was more ad hoc than usual, as the graduate coordinator was new in this position. In the 24/25 academic year, the coordinator for this program will carefully plan for future years which ways to best support our students in their assistantship duties.

Competence in a Wide Range of Mathematical Subject Areas

Learning Objective Description:

Beyond the core courses in algebra and analysis, students in the M.S. program are required to complete coursework in the content areas of combinatorics, complex-valued functions, numerical analysis and topology. By successfully completing all four courses, students will demonstrate competence in a much wider range of mathematical subject areas than they typically encounter as undergraduate students.

Comprehensive Examination

Indicator Description:

Students in the MS program will take a written comprehensive examination in the areas of abstract algebra and analysis. The examination will be scored by a committee of faculty.

Criterion Description:

At least two-thirds of our students will pass their comprehensive examinations.

Findings Description:

In the 23/24 academic year, only two students took comprehensive exams. Both of the students passed the exams, with some remediation required for one of the students.

Action - Comprehensive Examination

Action Description:

In the next year, the graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

Demonstrate Graduate-Level Research Skills

Learning Objective Description:

Students completing the MS with a thesis will demonstrate skills in completing original research.

Comprehensive Examination

Indicator Description:

Students in the MS program will take a written comprehensive examination in the areas of abstract algebra and analysis. The examination will be scored by a committee of faculty.

Criterion Description:

At least two-thirds of our students will pass their comprehensive examinations.

Findings Description:

In the 23/24 academic year, only two students took comprehensive exams. Both of the students passed the exams, with some remediation required for one of the students.

Action - Comprehensive Examination

Action Description:

In the next year, the graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

Effective Capstone Courses for Thesis and Non-Thesis Students

Indicator Description:

In order to ensure a successful research experience for both thesis and non-thesis students, our program offers courses that correspond to both concentrations. Thesis students complete both MATH 6398 and MATH 6099 while working independently with their thesis advisor to complete a research project and then write and defend their thesis based on that research. Non-thesis students must complete MATH 6380, typically during their third semester, and course requirements include both a written report on their research (to be approved by their research advisor) and a presentation of their research that could be in a poster session, a local seminar, or at an external conference.

Criterion Description:

We expect all graduate students in the program to complete the research requirements corresponding to their degree plan concentration (thesis or non-thesis).

Findings Description:

In the 23/24 school year, both students who were eligible to complete the research requirement chose the non-thesis track, requiring them to take MATH 6380, so the program met the expected criterion. Both students successfully completed their research requirements by presenting their work in written and oral format, as required by the indicator.

Action - Effective Capstone Courses for Thesis and Non-Thesis Students

Action Description:

The capstone courses in the M.S. program are working well. For the next year, the graduate coordinator will monitor student progress in this area for any necessary changes.

Demonstrate Mastery of Core Topics in Mathematics

Learning Objective Description:

The current core courses in our MS program are the sequences in algebra and analysis. Upon completion of these sequences, students will demonstrate mastery of both topics by successfully completing the corresponding comprehensive examinations.

Comprehensive Examination

Indicator Description:

Students in the MS program will take a written comprehensive examination in the areas of abstract algebra and analysis. The examination will be scored by a committee of faculty.

Criterion Description:

At least two-thirds of our students will pass their comprehensive examinations.

Findings Description:

In the 23/24 academic year, only two students took comprehensive exams. Both of the students passed the exams, with some remediation required for one of the students.

Action - Comprehensive Examination

Action Description:

In the next year, the graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

Establish 4+1 BS/MS Degree Plan

Goal Description:

Following the lead of the computer science department, we established a 4+1 BS/MS degree plan in mathematics. This program will serve students who are interested in pursuing both degrees at SHSU and attract transfer students who have not yet completed their BS degree and have an interest in completing both a BS and MS in mathematics. We will work to attract students for enrollment in this program.

Providing Department: Mathematics MS

Progress: Completed

RELATED ITEMS/ELEMENTS -

RELATED ITEM LEVEL 1

Recruit for 4+1 program

Performance Objective Description:

We will produce literature to advertise the program as well as approach students in mathematics classes who would be good candidates for the program.

RELATED ITEM LEVEL 2

Update graduate and undergraduate catalogues to include 4+1 degree pathway

KPI Description:

Submit documentation to SHSU catalogue to establish 4+1 degree pathway

Target Description:

B.S./M.S. 4+1 degree pathway appears in 2024 catalogue.

Results Description:

Documentation for the B.S./M.S. degree pathway has been submitted and appears in the 24/25 catalog.

RELATED ITEM LEVEL 3

Action - Update graduate and undergraduate catalogues to include 4+1 degree pathway

Action Description:

This item has been completed. No further action is required.

New Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

1. Piloting a summer internship program for students who enroll in Fall 2023 or Spring 2024, in coordination with recent graduates who are currently working in local industry positions.
2. Rebooting the Graduate Teaching Seminar for new students who will become Teaching Assistants in Fall 2024.
3. Continuing the Calculus/College Algebra Tutoring programs from Spring 2023, in coordination with the ASC, to provide an appropriate environment for graduate students to assist with freshman-level courses in these subjects.
4. Completing the proposal of a 5-year BS/MS program in mathematics, with guidance from the new department chair.

Update of Progress to the Previous Cycle's PCI:

1. At least one student applied for an internship program. Department leadership is working toward support of an internship program at the department level.

2. The former iteration of the Graduate Teaching Seminar was not viable in the 23/24 academic year because of low enrollment of second year students. Instead, students attended faculty classes and wrote reflections of their experiences.

3. The Calculus/College Algebra Tutoring programs were quite successful in the 23/24 academic year.

4. The BS/MS program was added to the catalog in 2024.

New Plan for Continuous Improvement Item

Closing Summary:

In the 24/25 academic year, the M.S. Mathematics program will make steps toward improvement in the following ways:

1. The graduate coordinator will consider changes to the comprehensive exam system in the M.S. Mathematics program.

2. The graduate coordinator will reconsider the current implementation of the teaching mentorship program in an effort to support the graduate assistants and teaching assistants in their duties.

3. The program will continue to offer Calculus/College Algebra Tutoring programs, which began in Spring 2023, in coordination with the ASC, to provide an appropriate environment for graduate students to assist with freshman-level courses in these subjects.