Mathematics MS

Emphasize Written Communication Skills

Goal Description:

The curriculum will provide students with opportunities to develop written communication skills typically required of professionals in the area of study. Thesis students typically gain this experience 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.

Providing Department: Mathematics MS

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

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.

RELATED ITEM LEVEL 1

Demonstrate Graduate-Level Research Skills

Learning Objective Description:

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

RELATED ITEM LEVEL 2

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 on their first attempt.

Findings Description:

During the 2022-23 academic year, more than two-thirds of our graduating students successfully completed the comprehensive exams on the first attempt.

RELATED ITEM LEVEL 3

Comprehensive Exam Results

Action Description:

Comprehensive exams for our two students who will continue the program from Spring 2023 to Fall 2023 are scheduled to complete the exams in August 2023.

RELATED ITEM LEVEL 2

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:

During the 2022-23 academic year, all graduating students successfully completed either a thesis (2 out of ten students) or the research requirements for MATH 6380, the non-thesis research course (8 out of 10 students).

RELATED ITEM LEVEL 2

Teaching Seminar

Indicator Description:

Graduate faculty will lead a teaching seminar with participation from graduate students. This seminar will meet at least monthly.

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:

During the Fall 2022 semester, our program experienced an exodus of roughly 60% of our new graduate students in the M.S. program. This reduced the number of continuing students to only two, an insufficient number to operate a successful teaching seminar.

RELATED ITEM LEVEL 3

Teaching Seminar

Action Description:

Due to a lack of qualified graduate students moving into a TA role for Fall 2023, we abandoned plans for a graduate teaching seminar in Spring 2023.

RELATED ITEM LEVEL 1

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.

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Establish a 4+1 BS/MS Degree Plan

Goal Description:

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

Providing Department: Mathematics MS Progress: Ongoing

Provide Degree Plan Options Consistent with Student Career Goals

Goal Description:

Our program typically serves students with three distinct career goals in mind: those seeking a Ph.D. in the future, those interested in teaching at the community college level, and those interested in pursuing a career in industry. As a result, we typically recommend a thesis option for those seeking a Ph.D. in the future and recommend a non-thesis option for other students. For those interested in pursuing a career in industry, extra training is needed to ensure that they have some essential programming skills and the kind of work experience desired by employers.

To improve our program's relevance for students seeking a career in industry, we intend to build a non-thesis option that is centered around a summer internship that would occur between their first and second years of study in the program. This option may also be particularly attractive for students pursuing a 4+1 BS/MS degree plan.

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 freshmanlevel 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.

Update to Previous Cycle's Plan for Continuous Improvement Item

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

Closing Summary

Our plan for improving the program in the coming academic year focuses on four items:

- 1. Initiation of a summer internship program for students who enroll in Fall 2022 or Spring 2023, in tandem with the statistics program.
- 2. Careful coordination of the new teaching experiences for our returning students that will be assigned TA duties.
- 3. Improvement of the Calculus Tutoring program from Spring 2023, in coordination with the ASC, to provide an appropriate environment for graduate students to assist with courses in our calculus sequence.
- 4. Rebooting the planned 5-year BS/MS program in mathematics, with guidance from the new department chair.

Update of Progress to the Previous Cycle's PCI:

Reviewing the PCI for the 2022-23 academic year, the following updates were made:

- 1. Initiation of the planned internship program was delayed. A pilot version is planned for Summer 2024, with a full version offered to interested students in Summer 2025.
- 2. Successful coordination of all graduate TA's in the Fall 2022 semester included six students who were a part of the coordination of MATH 1314 (and MATH N014), our college algebra course.
- 3. A Calculus Study Session program, coordinated by department faculty along with the ASC, was successfully operated by three graduate students in both the Fall 2022 and Spring 2023 semesters. Moreover, a similar program for college algebra students was piloted successfully in Spring 2023.

4. New course offerings and a new plan for non-thesis students (focused on an internship option) were successfully reviewed during the 2022-23 academic year. These new options will be included in a proposal for the 4+1 BS/MS degree plan.

New Plan for Continuous Improvement Item

Closing Summary:

Our plan for improving the program in the coming academic year focuses on three items:

- 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.