

Master of Science Degree Program in Mathematics

Goals and Associated Outcomes

Goal 1: Graduates will have acquired a firm foundation of knowledge of fundamental mathematical concepts, methods, language and modes of reasoning sufficient to support careers either in Industry or in Teaching at the secondary level or at the junior college level.

Outcomes: The student exhibits the ability to:

- (a) Use important definitions and results correctly.
- (b) Apply mathematical results and procedures to concrete problems.
- (c) Use mathematical software to investigate and solve problems.
- (d) Analyze quantitative data using appropriate mathematical tools.
- (e) Generate straightforward extensions of mathematical procedures and results.

Goal 2: Graduates will be able to communicate mathematical ideas and results clearly and with appropriate precision, both orally and in writing.

Outcomes: The student exhibits the ability to:

- (a) Use mathematical notation and terminology correctly.
- (b) Explain the reasoning that supports solutions to mathematical problems.
- (c) Convey the meaning of mathematical concepts.

Goal 3: Graduates will have acquired sufficient mathematical background and experience to use the professional literature to progress further on their own.

Outcomes: The student exhibits the ability to:

- (a) Use the professional literature (journal articles, articles available on the web, higher-level textbooks, etc.) to write a paper on a mathematical topic not covered in formal study.

Overview

Our principal assessment tool is the exit project required of every M. S. student. The exit project is a written project which may involve literature search, problem solving and/or computer work. The final outcome is a technical report. Each spring, these reports are evaluated against the specified outcomes by the department's Graduate Assessment Committee. The Chair and the Graduate Program Director are actively involved and a report is made to the Graduate Program Committee (GPC),

Goals and Outcomes

Early attempts at departmental self-assessment of the graduate program were too complicated and did not separate the M.S. and M.A. programs. The present collection above was developed in Fall 2002 using input from the GPC and open meetings and agreed to by the entire department. They have served us well and have not been changed since then.

Research Methods

We collect the technical reports for the preceding calendar year in the Spring semester each year. We evaluate each of them against a ten question checklist with a 9 point rubric that covers the above goals and outcomes. This instrument has not been modified and is attached.

Findings

The scores for the 9 projects analyzed were 8.2, 8.4, 8.4, 8.6, 8.75, 8.8, 9, 9, 9 and yielding an average score of about 8.7 on a 9 point scale, with a score of 7-9 representing a high rating. This is consistent with the last three years. A degree of variation is explained by the mathematical specialization of faculty members who form each year's committee

Anything 6.5 or higher represents excellent work by our students.

Review

The reports were analyzed in the Spring Semester, 2010, by a four-person committee with input from the Chair. Each committee member evaluated each report. Results of the analysis are reviewed by the Chair, Graduate Program Director, and GPC Chair, as well as members of the GPC. Any significant results are reported to the faculty at large for discussion and action.

Actions

The faculty is doing a good job in outlining what is expected in the technical reports and the students continue to do excellent work in fulfilling this requirement. We just have to continue doing more of the same. It is contemplated that our students completing the exit projects should make presentations of their works in some forum. Perhaps it could be combined with oral interview by few committee members.

This year, a programmatic change was made in our MS/MA programs. Previously the exit project was a non-credit-bearing exit requirement: students variously completed it in addition to their course work, substituted some of their course work with work done for the exit project, and also, where used for credit, completed the exit requirement with varying amounts of credit. Furthermore, supervision of exit projects was on off-load assignment for faculty. Now, the exit project is a four-credit requirement (4 credits have been added to the program) in addition to the previous amount of coursework, and is an on-load assignment for faculty. Formalizing the requirement in this way should make it easier tracking and recording these projects; may help maintain consistency across individual projects; and provides an incentive for faculty to participate which, hopefully, will provide the students with greater choice in terms of topic and supervisor. The first project completed under the new design will be done this year. However, most exit projects completed in calendar year 2010 will still be under the old requirements.

It is intended that this report, together with its counterpart for our MS program, and the reviews from the office of assessment generated by each, be presented briefly and discussed at a fall Department meeting.

Master of Arts Degree Program in Mathematics

Goals and Associated Outcomes

Goal 1: Graduates will have acquired a firm foundation of knowledge of fundamental mathematical concepts, methods, language and modes of reasoning sufficient to support careers in Teaching at the secondary level.

Outcomes: The student exhibits the ability to:

- (a) Use mathematical concepts and results clearly and correctly.
- (b) Apply mathematical results and procedures to concrete problems.

Goal 2: Graduates will be able to communicate mathematical ideas and results clearly and with appropriate precision, both orally and in writing.

Outcomes: The student exhibits the ability to:

- (a) Use mathematical notation and terminology correctly.
- (b) Explain the reasoning that supports solutions to mathematical problems.
- (c) Convey the meaning of mathematical concepts.

Goal 3: Graduates will have acquired sufficient mathematical background and experience to use the professional literature to progress further on their own.

Outcomes: The student exhibits the ability to:

- (a) Use the professional literature (journal articles, articles available on the web, higher-level textbooks, etc.) to write a paper on a mathematical topic not covered in formal study.

Overview

Our principal assessment tool is the exit project required of every M. A. student. The exit project is a written project which may involve literature search, problem solving and/or computer work. The final outcome is a technical report. Each spring, these reports are evaluated against the specified outcomes by the department's Graduate Assessment Committee. The Chair and the Graduate Program Director are actively involved and a report is made to the Graduate Program Committee (GPC),

Goals and Outcomes

Early attempts at departmental self-assessment of the graduate program were too complicated and did not separate the M.S. and M.A. programs. The present collection above was developed in Fall 2002 using input from the GPC and open meetings and agreed to by the entire department. They have served us well and have not been changed since then.

Research Methods

We collect the technical reports for the preceding calendar year in the Spring semester each year. We evaluate each of them against a ten question checklist with a 9 point rubric that covers the above goals and outcomes. This instrument has not been modified, and is attached

Findings

The scores for the two projects analyzed were 8.6 and 9, yielding an average of 8.8 on a 9 point scale, with a score of 7-9 representing a high rating. This compares favorably to an average of 7.35 and 6.60 for the preceding two years. We had two exceptional students who put in a lot of effort.

Anything 6.5 or higher represents excellent work by our students

Review

The reports were analyzed in the Spring Semester, 2010, by a four-person committee with input from the Chair. Each committee member evaluated each report. Results of the analysis are reviewed by the Chair, Graduate Program Director, and GPC Chair, as well as members of the GPC.

Actions

The faculty is doing a good job in outlining what is expected in the technical reports and the students continue to do excellent work in fulfilling this requirement. We just have to continue doing more of the same. We are also contemplating that the students completing these projects could be interviewed and/or make presentations of their completed works in some suitable forum. Some committee members could interview and/or evaluate students' presentations.

Our MA program has been struggling for some time with low enrollments. Because of this, we envision making fundamental changes to this program over the next year or so. The assessment plan for the MA program will therefore need to be revisited.

It is intended that this report, together with its counterpart for our MS program, and the reviews from the office of assessment generated by each, be presented briefly and discussed at a fall Department meeting.

Student Name _____

Master of Science Project Checklist

Mark each question from 1-9 (9 being best) or with NA when it does not apply to the project at hand. At the end, take the average of the non-NA scores. This is the overall evaluation for the project.

- | | |
|--|-------|
| 1. Uses important definitions and/or results correctly | _____ |
| 2. Analyzes information well | _____ |
| 3. Uses mathematical language and symbols appropriately | _____ |
| 4. Uses mathematical techniques well | _____ |
| 5. Uses mathematics appropriate for the problem | _____ |
| 6. Uses software appropriate for the problem | _____ |
| 7. Formulates appropriate and convincing conclusions | _____ |
| 8. Explains the problem and work clearly | _____ |
| 9. Displays a knowledge of literature on the subject | _____ |
| 10. Displays an in-depth analysis of the problem or area | _____ |

Overall Score: _____

A score of 7-9 rates the project as **High**; 4-6 as **Medium**; and 1-3 as **Low**.

High represents a project displaying a complete response to the problem set forth. The general analysis and write-up should be correct, clear and coherent, communicating the problem and the relevant mathematics effectively to the intended audience. The project should display an understanding of the ideas and processes involved and, where appropriate, should contain examples and/or counterexamples.

Medium represents a complete solution to the problem set forth, but the explanation may be unclear in places, there may be minor mathematical mistakes or understanding of the underlying concepts or techniques may not be displayed in a convincing manner. In general, however, the analysis and conclusions are correct.

Low represents either a lack of solution of the problem set forth or an explanation which lacks coherence and/or clarity. There may be gross mathematical errors or errors in analysis and conclusions which do not (or apparently do not) follow from the analysis.

Rater _____

Student Name _____

Master of Arts Project Checklist