Analysis Questions and Analysis Answers

For Academic Programs

Informed by your assessment activities related to student learning, what changes have you made in your degree program in the last three to five years? Describe the changes (e.g., curriculum revision, new courses, faculty development), the general results that prompted the changes (e.g., student performance on an assessment measure), and any impact on student learning that you might attribute to these changes.

The mathematics department set a goal to increase number of master’s degree students as the pipeline to feed in its Ph.D. program.
In the last few years, the number of students earned a master’s degree increased from 6 in 1011-1012 to 10 in 2013 - 2014.

Mission / Purpose

1. Provide high-quality and broad-based undergraduate and graduate education to our B.S., M.A. and PhD students in mathematics and to other students taking mathematics courses. 2. Conduct high-quality research and scholarly activities that will advance the state of knowledge in mathematics. 3. Contribute to the mathematics profession and our society through service and outreach activities.

Student Learning Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Good Understanding
Master's students will demonstrate a good understanding of mathematics after their first year.

Connected Documents
Curriculum Maps II-Maths M.A.
Curriculum Maps I-Maths M.A.
Grading Rubric for Exams-Maths M.A.
Rubric for Theses-Maths M.A.
Topics Evaluated-Maths M.A.

Relevant Associations:
The assessment results show that our graduate students have been very successful in their first year learning. The success is also due to our faculty’s efforts in teaching, mentoring, and advising.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes

General Education/Core Curriculum Associations
8 Mathematics - SLO is related to the essential characteristics and basic processes of inquiry and analysis in the discipline, encourages the development of critical thinking and requires students to analyze, synthesize and evaluate knowledge

Strategic Plan Associations
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.

Related Measures

M 1: Exam Performance for 1st Semester
Assessment will be based on final exams in their first semester courses. The percentage of students who achieve an average of 80% or higher on select topics on their exams will be calculated.
Source of Evidence: Standardized test of subject matter knowledge
Target:
80% of masters students will achieve an average of 80% or higher on select topics on their exams.

M 2: Exam Performance for 2nd Semester
Assessment will be based on students’ final exams of their second semester courses. The percentage of students who achieve an average of 80% or higher on select topics on their exams will be calculated.
Source of Evidence: Standardized test of subject matter knowledge
Target:
80% of masters students will achieve an average of 80% or higher on select topics on their exams.

SLO 2: Professional Communication Ability
Master's students will be able to communicate mathematics in a professional manner.

Connected Documents
Curriculum Maps II-Maths M.A.
Relevant Associations:
The assessment results show that our Master's students are able to communicate mathematics in a professional manner. Although this conclusion is made only based on measure 2, the fact that 90% of students (or 9 out of 10) have achieved 70% or higher on the Qualifying Exam makes our conclusion solid.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes

General Education/Core Curriculum Associations
8 Mathematics - SLO is related to the essential characteristics and basic processes of inquiry and analysis in the discipline, encourages the development of critical thinking and requires students to analyze, synthesize and evaluate knowledge

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University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.

Related Measures

M 3: Thesis/Project Evaluation
Assessment will be based on an evaluation of students’ thesis or project using a rubric completed by faculty committee members. The percentage of students who average is 3 (satisfactory) or higher on the rubric will be calculated.

Source of Evidence: Senior thesis or culminating major project

Target:
80% of master’s students will have an average of 3 (satisfactory) or higher.

M 4: Assessment based on exams
For students being graduated with plan II through the passing qualifying exam, assessment will be based on a rubric used qualifying exams. Faculty members complete the rubric. The percentage of students who achieve 70% on the exam will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

Target:
80% of students will achieve 70% on the exam.

Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

OthOtcm 3: Program Outcome: High Level of Recognized Quality
The program will improve and sustain a high level of recognized quality.

Connected Documents
Employer Survey-Maths M.A.
Faculty/Student Survey-Maths M.A.

Relevant Associations:
The assessment results based on the faculty and graduate survey show that our program is at a high level of recognized quality. We will continue the current practice and aim on doing more and better for our graduate program.

Related Measures

M 5: Seminar Attendance
50% of Master's students should attend at least 3 Graduate Seminars.

Source of Evidence: Academic indirect indicator of learning - other

Target:
50% of Master's students should attend at least 3 Graduate Seminars.

M 6: Response from surveys
An average of 4 points from the following surveys is a good indicator for a high level of recognized quality.

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Master's Student</th>
<th>PhD Student</th>
<th>Passed Q-Exam</th>
<th>Will Take Q-Exam</th>
<th>Will NOT take Q-Exam</th>
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</thead>
<tbody>
<tr>
<td>Students can learn from the talk</td>
<td>Strongly Agree (5)</td>
<td>Agree (4)</td>
<td>Undecided (3)</td>
<td>Disagree (2)</td>
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<td>Topics enhances students’ research interest</td>
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<td>Disagree (2)</td>
<td>Strongly disagree (1)</td>
</tr>
</tbody>
</table>
Source of Evidence: Student course evaluations on learning gains made

Target:
To have an average of 4 points or better from the survey.

**OthOtm 4: Program Outcome: Sustain Optimal Level of Enrollment**
The program will build and sustain an optimal level of annual program enrollments and degree completion.

**Connected Document**
Faculty/Student Survey-Maths M.A.

**Relevant Associations:**
The assessment results show that our production goal, which is double the degree completion requirement set by ACHE, has been accomplished. Also the current enrollment at Master's level is low, which is due to the success in recruiting PhD students, the overall graduate enrollment is healthy and is growing.

**Related Measures**

**M 7: Increase Enrollments**
Increase enrollments by at least 10% each year to reach a total of 30 graduate students in our Master program. Currently we have 13 Master's students.

Source of Evidence: Academic indirect indicator of learning - other

Target:
To have 14 or more Master's students.

**Related Action Plans (by Established cycle, then alpha):**

**Increase Master's students**
*Established in Cycle: 2011-2012*
The reason for the current low enrollment at Master's level is that we are very successful in recruiting PhD students. As long a...

For full information, see the Details of Action Plans section of this report.

**M 8: Double the degree completion requirement**
Double the degree completion requirement set by ACHE: 3.75 graduates/year.

Source of Evidence: Academic indirect indicator of learning - other

Target:
To have at least 8 Master's degree completion.

**OthOtm 5: Program Outcome: Highly Valued by Program Graduates**
The program will be highly valued by its program graduates and other key constituencies it serves.

**Connected Documents**
Faculty/Student Survey-Maths M.A.
Fresh Graduates Survey-Maths M.A.

**Relevant Associations:**
The assessment results show that, based on the survey of our recent graduate students, our graduate program prepares our graduate students well for their work. We are confident to believe their employers have similar evaluation also. We will continue to conduct the survey in the coming years.

**Related Measures**

**M 9: Employer Survey**
Survey the employers of our recent graduates about their satisfaction, quality and performance of our graduates at their work places.

Source of Evidence: Employer survey, incl. perceptions of the program

Target:
To collect useful information for our graduate program.

**Related Action Plans (by Established cycle, then alpha):**

**Survey employers or recent graduates**
*Established in Cycle: 2011-2012*
We need to keep up the effort and find effective ways to conduct survey. We will check with college exporters for ideas and good...

For full information, see the Details of Action Plans section of this report.

**M 10: Recent graduates survey**
Survey our recent graduates about their perception on how well the program prepares them for their work.

Source of Evidence: Student satisfaction survey at end of the program

Target:
To collect useful information for our graduate program.

**Details of Action Plans for This Cycle (by Established cycle, then alpha)**

**Increase Master's students**
The reason for the current low enrollment at Master's level is that we are very successful in recruiting PhD students. As long as the total enrollment in our graduate programs is healthy and is growing we will not worry about the enrollment at Master's level.
**Established in Cycle:** 2011-2012  
**Implementation Status:** In-Progress  
**Priority:** High  

**Relationships (Measure | Outcome/Objective):**  
*Measure:* Increase Enrollments  
*Outcome/Objective:* Program Outcome: Sustain Optimal Level of Enrollment

**Survey employers or recent graduates**  
We need to keep up the effort and find effective ways to conduct survey. We will check with college exporters for ideas and good practices.

**Established in Cycle:** 2011-2012  
**Implementation Status:** In-Progress  
**Priority:** High  

**Relationships (Measure | Outcome/Objective):**  
*Measure:* Employer Survey  
*Outcome/Objective:* Program Outcome: Highly Valued by Program Graduates
University of Alabama

Detailed Assessment Report
2012-2013 Mathematics M.A.
As of: 7/31/2014 09:40 AM CENTRAL

Mission / Purpose
1. Provide high-quality and broad-based undergraduate and graduate education to our B.S., M.A. and PhD students in mathematics and to other students taking mathematics courses. 2. Conduct high-quality research and scholarly activities that will advance the state of knowledge in mathematics. 3. Contribute to the mathematics profession and our society through service and outreach activities.

Student Learning Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Good Understanding
Master's students will demonstrate a good understanding of mathematics after their first year.

Connected Documents
Curriculum Maps II-Maths M.A.
Curriculum Maps I-Maths M.A.
Grading Rubric for Exams-Maths M.A.
Rubric for Theses-Maths M.A.
Topics Evaluated-Maths M.A.

Relevant Associations:
The assessment results show that our graduate students have been very successful in their first year learning. The success is also due to our faculty's efforts in teaching, mentoring, and advising.

Standard Associations
SACS 3.3.1
3.3.1.1 Educational programs, to include student learning outcomes

General Education/Core Curriculum Associations
8 Mathematics - SLO is related to the essential characteristics and basic processes of inquiry and analysis in the discipline, encourages the development of critical thinking and requires students to analyze, synthesize and evaluate knowledge

Strategic Plan Associations
University of Alabama
1.1 Promote and enhance areas of academic, scholarship, and research excellence.

Related Measures

M 1: Exam Performance for 1st Semester
Assessment will be based on final exams in their first semester courses. The percentage of students who achieve an average of 80% or higher on select topics on their exams will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

Target:
80% of masters students will achieve an average of 80% or higher on select topics on their exams.

Finding (2012-2013) - Target: Met
Fall 2012: MA511, MA554, MA565, 573 and 580 are taught by Dr. Belbas, J. Wang, Roberts, Dixon and Knese. All master's students took the listed courses have achieved an average of 80% or higher on select topics on their final exams.

M 2: Exam Performance for 2nd Semester
Assessment will be based on students' final exams of their second semester courses. The percentage of students who achieve an average of 80% or higher on select topics on their exams will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

Target:
80% of masters students will achieve an average of 80% or higher on select topics on their exams.

Finding (2012-2013) - Target: Met
Spring 2012: MA587, MA521, and MA555 are taught by Drs. Naggers, Belbas, J. Wang. All master's students took the listed courses have achieved an average of 80% or higher on select topics on their final exams.

SLO 2: Professional Communication Ability
Master's students will be able to communicate mathematics in a professional manner.

Connected Documents
Curriculum Maps II-Maths M.A.
Curriculum Maps I-Maths M.A.
Grading Rubric for Exams-Maths M.A.
Rubric for Theses-Maths M.A.
Topics Evaluated-Maths M.A.

Relevant Associations:
The assessment results show that our Master's students are able to communicate mathematics in a professional manner. Although this conclusion is made only based on measure 2, the fact that 90% of students (or 9 out of 10) have
achieved 70% of higher on the Qualifying Exam makes our conclusion solid.

**Standard Associations**

*SACS 3.3.1*

3.3.1.1 Educational programs, to include student learning outcomes

**General Education/Core Curriculum Associations**

8 Mathematics - SLO is related to the essential characteristics and basic processes of inquiry and analysis in the discipline, encourages the development of critical thinking and requires students to analyze, synthesize and evaluate knowledge

**Strategic Plan Associations**

University of Alabama

1.1 Promote and enhance areas of academic, scholarship, and research excellence.

**Related Measures**

**M 3: Thesis/Project Evaluation**

Assessment will be based on an evaluation of students' thesis or project using a rubric completed by faculty committee members. The percentage of students who average is 3 (satisfactory) or higher on the rubric will be calculated.

Source of Evidence: Senior thesis or culminating major project

**Target:**

80% of master’s students will have an average of 3 (satisfactory) or higher.

**Finding (2012-2013) - Target: Met**

There is no Master theses or Master projects at this time period. All students elect to take the Qualifying Exams to fulfill the requirement for Master degree.

**M 4: Assessment based on exams**

For students being graduated with plan II through the passing qualifying exam, assessment will be based on a rubric used qualifying exams. Faculty members complete the rubric. The percentage of students who achieve 70% on the exam will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

**Target:**

80% of students will achieve 70% on the exam.

**Finding (2012-2013) - Target: Met**

81.8% of students (or 9 out of 11) have achieved 80% of higher on the Qualifying Exam

**Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans**

**OthOtm3: Program Outcome: High Level of Recognized Quality**

The program will improve and sustain a high level of recognized quality.

**Connected Documents**

Employer Survey-Maths M.A.
Faculty/Student Survey-Maths M.A.

**Relevant Associations:**

The assessment results based on the faculty and graduate survey show that our program is at a high level of recognized quality. We will continue the current practice and aim on doing more and better for our graduate program.

**Related Measures**

**M 5: Seminar Attendance**

50% of Master’s students should attend at least 3 Graduate Seminars.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**

50% of Master’s students should attend at least 3 Graduate Seminars.

**Finding (2012-2013) - Target: Met**

All graduate students attended at least 3 graduate seminars during the academic year 2012-13.

**M 6: Response from surveys**

An average of 4 points from the following surveys is a good indicator for a high level of recognized quality.

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### OthOtcm 4: Program Outcome: Sustain Optimal Level of Enrollment

The program will build and sustain an optimal level of annual program enrollments and degree completion.

**Connected Document**

Faculty/Student Survey-Maths M.A.

**Relevant Associations:**

The assessment results show that our production goal, which is double the degree completion requirement set by ACHE, has been accomplished. Also the current enrollment at Master's level is low, which is due to the success in recruiting PhD students, the overall graduate enrollment is healthy and is growing.

**Related Measures**

**M 7: Increase Enrollments**

Increase enrollments by at least 10% each year to reach a total of 30 graduate students in our Master program. Currently we have 13 Master's students.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**

To have 14 or more Master's students.

**Finding (2012-2013) - Target: Partially Met**

Currently, we have 7 Master's students. We will continue our effort to recruit more masters students. We are very successful in recruiting PhD students. As long as the total enrollment in our graduate programs is healthy and is growing we will not worry about the enrollment at Master's level.

**Related Action Plans (by Established cycle, then alpha):**

**Increase Master's students**

*Established in Cycle: 2011-2012*

The reason for the current low enrollment at Master's level is that we are very successful in recruiting PhD students. As long as...

For full information, see the Details of Action Plans section of this report.

**M 8: Double the degree completion requirement**

Double the degree completion requirement set by ACHE: 3.75 graduates/year.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**

To have at least 8 Master's degree completion.

**Finding (2012-2013) - Target: Not Met**

We have produced 3 Master's students during the academic year of 2012-13.

### OthOtcm 5: Program Outcome: Highly Valued by Program Graduates

The program will be highly valued by its program graduates and other key constituencies it serves.

**Connected Documents**

Faculty/Student Survey-Maths M.A.

Fresh Graduates Survey-Maths M.A.

**Relevant Associations:**

The assessment results show that, based on the survey of our recent graduate students, our graduate program prepares our graduate students well for their work. We are confident to believe their employers have similar evaluation also. We will continue to conduct the survey in the coming years.

**Related Measures**

**M 9: Employer Survey**

Survey the employers of our recent graduates about their satisfaction, quality and performance of our graduates at their work places.
Source of Evidence: Employer survey, incl. perceptions of the program

**Target:**
To collect useful information for our graduate program.

**Finding (2012-2013) - Target: Met**
We continue enjoy the fact that all our graduates are successful in the job market. The feedback suggest that our graduates are doing a good job in their universities/colleges.

**Related Action Plans (by Established cycle, then alpha):**

Survey employers or recent graduates
*Established in Cycle: 2011-2012*
We need to keep up the effort and find effective ways to conduct survey. We will check with college exporters for ideas and good...

For full information, see the Details of Action Plans section of this report.

**M 10: Recent graduates survey**
Survey our recent graduates about their perception on how well the program prepares them for their work.

Source of Evidence: Student satisfaction survey at end of the program

**Target:**
To collect useful information for our graduate program.

**Finding (2012-2013) - Target: Met**
All recent graduate students agree that the program prepares them well for their academic work.

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**Details of Action Plans for This Cycle (by Established cycle, then alpha)**

**Increase Master's students**
The reason for the current low enrollment at Master's level is that we are very successful in recruiting PhD students. As long as the total enrollment in our graduate programs is healthy and is growing we will not worry about the enrollment at Master's level.

*Established in Cycle: 2011-2012*

**Implementation Status:** In-Progress
**Priority:** High

**Relationships (Measure | Outcome/Objective):**
*Measure: Increase Enrollments | Outcome/Objective: Program Outcome: Sustain Optimal Level of Enrollment*

**Survey employers or recent graduates**
We need to keep up the effort and find effective ways to conduct survey. We will check with college exporters for ideas and good practices.

*Established in Cycle: 2011-2012*

**Implementation Status:** In-Progress
**Priority:** High

**Relationships (Measure | Outcome/Objective):**
*Measure: Employer Survey | Outcome/Objective: Program Outcome: Highly Valued by Program Graduates*
Mission / Purpose

1. Provide high-quality and broad-based undergraduate and graduate education to our B.S., M.A. and PhD students in mathematics and to other students taking mathematics courses. 2. Conduct high-quality research and scholarly activities that will advance the state of knowledge in mathematics. 3. Contribute to the mathematics profession and our society through service and outreach activities.

Student Learning Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Good Understanding
Master's students will demonstrate a good understanding of mathematics after their first year.

Connected Documents

- Curriculum Maps II-Maths M.A.
- Curriculum Maps I-Maths M.A.
- Grading Rubric for Exams-Maths M.A.
- Rubric for Theses-Maths M.A.
- Topics Evaluated-Maths M.A.

Relevant Associations:
The assessment results show that our graduate students have been very successful in their first year learning. The success is also due to our faculty's efforts in teaching, mentoring, and advising.

Standard Associations

- SACS 3.3.1
  3.3.1.1 Educational programs, to include student learning outcomes

General Education/Core Curriculum Associations

- Mathematics - SLO is related to the essential characteristics and basic processes of inquiry and analysis in the discipline, encourages the development of critical thinking and requires students to analyze, synthesize and evaluate knowledge

Strategic Plan Associations

University of Alabama
  1.1 Promote and enhance areas of academic, scholarship, and research excellence.

Related Measures

M 1: Exam Performance for 1st Semester
Assessment will be based on final exams in their first semester courses. The percentage of students who achieve an average of 80% or higher on select topics on their exams will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

Target:
80% of masters students will achieve an average of 80% or higher on select topics on their exams.

Finding (2011-2012) - Target: Met
Fall 2011: MA565, 571 and 520 are taught by Dr. Liem, Dixon, Sun. All master's students took the listed courses have achieved an average of 80% or higher on select topics on their final exams.

M 2: Exam Performance for 2nd Semester
Assessment will be based on students' final exams of their second semester courses. The percentage of students who achieve an average of 80% or higher on select topics on their exams will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

Target:
80% of masters students will achieve an average of 80% or higher on select topics on their exams.

Finding (2011-2012) - Target: Met
Spring 2012: MA587, 510, 566 and 555 are taught by Drs. Trace, Geng, Roberts and Belbas. All master's students took the listed courses have achieved an average of 80% or higher on select topics on their final exams.

SLO 2: Professional Communication Ability
Master's students will be able to communicate mathematics in a professional manner.

Connected Documents

- Curriculum Maps II-Maths M.A.
- Curriculum Maps I-Maths M.A.
- Grading Rubric for Exams-Maths M.A.
- Rubric for Theses-Maths M.A.
- Topics Evaluated-Maths M.A.

Relevant Associations:
The assessment results show that our Master's students are able to communicate mathematics in a professional manner. Although this conclusion is made only based on measure 2, the fact that 90% of students (or 9 out of 10) have
achieved 70% of higher on the Qualifying Exam makes our conclusion solid.

**Standard Associations**

**SACS 3.3.1**

3.3.1.1 Educational programs, to include student learning outcomes

**General Education/Core Curriculum Associations**

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**Strategic Plan Associations**

University of Alabama

1.1 Promote and enhance areas of academic, scholarship, and research excellence.

**Related Measures**

**M 3: Thesis/Project Evaluation**

Assessment will be based on an evaluation of students’ thesis or project using a rubric completed by faculty committee members. The percentage of students who average is 3 (satisfactory) or higher on the rubric will be calculated.

Source of Evidence: Senior thesis or culminating major project

**Target:**

80% of master’s students will have an average of 3 (satisfactory) or higher.

**Finding (2011-2012) - Target: Met**

There is no Master theses or Master projects at this time period. All students elect to take the Qualifying Exams to fulfill the requirement for Master degree.

**M 4: Assessment based on exams**

For students being graduated with plan II through the passing qualifying exam, assessment will be based on a rubric used qualifying exams. Faculty members complete the rubric. The percentage of students who achieve 70% on the exam will be calculated.

Source of Evidence: Standardized test of subject matter knowledge

**Target:**

80% of students will achieve 70% on the exam.

**Finding (2011-2012) - Target: Met**

90% of students (or 9 out of 10) have achieved 70% of higher on the Qualifying Exam.

**Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans**

**OthOtcn 3: Program Outcome: High Level of Recognized Quality**

The program will improve and sustain a high level of recognized quality.

**Connected Documents**

- Employer Survey-Maths M.A.
- Faculty/Student Survey-Maths M.A.

**Relevant Associations:**

The assessment results based on the faculty and graduate survey show that our program is at a high level of recognized quality. We will continue the current practice and aim on doing more and better for our graduate program.

**Related Measures**

**M 5: Seminar Attendance**

50% of Master’s students should attend at least 3 Graduate Seminars.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**

50% of Master’s students should attend at least 3 Graduate Seminars.

**Finding (2011-2012) - Target: Met**

All graduate students attended at least 3 graduate seminars during the academic year 2011-12.

**M 6: Response from surveys**

An average of 4 points from the following surveys is a good indicator for a high level of recognized quality.

<table>
<thead>
<tr>
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<th>Master's Student</th>
<th>PhD Student</th>
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<td>Disagree (2)</td>
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</tr>
</tbody>
</table>
Source of Evidence: Student course evaluations on learning gains made

**Target:**
To have an average of 4 points or better from the survey.

**Finding (2011-2012) - Target: Met**
The survey is conducted right after each Graduate Seminar. The result is gathered in the following.

<table>
<thead>
<tr>
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<th>Master's Student</th>
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<th>Will NOT take Q-Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7</td>
<td>4.64</td>
<td>4.8</td>
<td>4.82</td>
<td>4.25</td>
<td>4.45</td>
</tr>
<tr>
<td>5</td>
<td>4.2</td>
<td>4.47</td>
<td>4.64</td>
<td>4</td>
<td>4.18</td>
</tr>
<tr>
<td>5</td>
<td>4.8</td>
<td>4.53</td>
<td>4.55</td>
<td>4.5</td>
<td>4.55</td>
</tr>
</tbody>
</table>

**OthOtcm 4: Program Outcome: Sustain Optimal Level of Enrollment**
The program will build and sustain an optimal level of annual program enrollments and degree completion.

**Connected Document**
Faculty/Student Survey-Maths M.A.

**Relevant Associations:**
The assessment results show that our production goal, which is double the degree completion requirement set by ACE, has been accomplished. Also the current enrollment at Master's level is low, which is due to the success in recruiting PhD students, the overall graduate enrollment is healthy and is growing.

**Related Measures**

**M 7: Increase Enrollments**
Increase enrollments by at least 10% each year to reach a total of 30 graduate students in our Master program. Currently we have 13 Master's students.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
To have 14 or more Master's students.

**Finding (2011-2012) - Target: Not Met**
Currently, we have 4 Master's students. This is because 1) many have graduated and 2) many are now in our PhD program. We are very successful in recruiting PhD students. Currently we have 8 more PhD students than last year. As long as the total enrollment in our graduate programs is healthy and is growing we will not worry about the enrollment at Master's level.

**Related Action Plans (by Established cycle, then alpha):**

**Increase Master's students**
Established in Cycle: 2011-2012
The reason for the current low enrollment at Master's level is that we are very successful in recruiting PhD students. As long a...

For full information, see the Details of Action Plans section of this report.

**M 8: Double the degree completion requirement**
Double the degree completion requirement set by ACE: 3.75 graduates/year.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
To have at least 8 Master's degree completion.

**Finding (2011-2012) - Target: Met**
We have produced 8 Master's students during the academic year of 2011-12.

**OthOtcm 5: Program Outcome: Highly Valued by Program Graduates**
The program will be highly valued by its program graduates and other key constituencies it serves.

**Connected Documents**
Faculty/Student Survey-Maths M.A.
Fresh Graduates Survey-Maths M.A.

**Relevant Associations:**
The assessment results show that, based on the survey of our recent graduate students, our graduate program prepares our graduate students well for their work. We are confident to believe their employers have similar evaluation also. We will continue to conduct the survey in the coming years.

**Related Measures**

**M 9: Employer Survey**
Survey the employers of our recent graduates about their satisfaction, quality and performance of our graduates at their work places.

Source of Evidence: Employer survey, incl. perceptions of the program
Target:
To collect useful information for our graduate program.

**Finding (2011-2012) - Target: Not Reported This Cycle**
The survey has been distributed. However, no date has been collected yet.

**Related Action Plans (by Established cycle, then alpha):**

**Survey employers or recent graduates**
*Established in Cycle: 2011-2012*  
We need to keep up the effort and find effective ways to conduct survey. We will check with college exporters for ideas and good...

For full information, see the Details of Action Plans section of this report.

**M 10: Recent graduates survey**
Survey our recent graduates about their perception on how well the program prepares them for their work.

Source of Evidence: Student satisfaction survey at end of the program

**Target:**
To collect useful information for our graduate program.

**Finding (2011-2012) - Target: Met**
All recent graduate students agree that the program prepares them well for their work.

---

**Details of Action Plans for This Cycle (by Established cycle, then alpha)**

**Increase Master's students**
The reason for the current low enrollment at Master's level is that we are very successful in recruiting PhD students. As long as the total enrollment in our graduate programs is healthy and is growing we will not worry about the enrollment at Master's level.

*Established in Cycle: 2011-2012*  
*Implementation Status: In-Progress*  
*Priority: High*

**Relationships (Measure | Outcome/Objective):**
- **Measure:** Increase Enrollments  
- **Outcome/Objective:** Program Outcome: Sustain Optimal Level of Enrollment

**Survey employers or recent graduates**
We need to keep up the effort and find effective ways to conduct survey. We will check with college exporters for ideas and good practices.

*Established in Cycle: 2011-2012*  
*Implementation Status: In-Progress*  
*Priority: High*

**Relationships (Measure | Outcome/Objective):**
- **Measure:** Employer Survey  
- **Outcome/Objective:** Program Outcome: Highly Valued by Program Graduates
**Curriculum Maps #1 (In which courses or in what activities or assignments are Student Learning Outcomes Addressed)**

Use "Introduce" when outcome is first address; “Reinforce” when outcome is reinforced; and “Master” when outcome is expected to be mastered. Note that you do not need to obtain a measure from every course in which an outcome is addressed (see Map #2)

**Curriculum Map 1 (Student Learning Outcomes)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Learning Outcome 1</th>
<th>Student Learning Outcome 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math565-566</td>
<td>Master’s students will demonstrate a good understanding of mathematics after their first year</td>
<td>Master’s students will be able to communicate mathematics in a professional manner.</td>
</tr>
<tr>
<td>Math571-573</td>
<td>Master</td>
<td></td>
</tr>
<tr>
<td>Math587-580</td>
<td>Master</td>
<td></td>
</tr>
<tr>
<td>Math510-511</td>
<td>Master</td>
<td></td>
</tr>
<tr>
<td>Math520-521</td>
<td>Master</td>
<td></td>
</tr>
<tr>
<td>Math554-555</td>
<td>Master</td>
<td></td>
</tr>
<tr>
<td>thesis/project</td>
<td></td>
<td>Master</td>
</tr>
</tbody>
</table>
Curriculum Map II  (What assessment measures will be employed in which courses/activities/assignments for each Student learning Outcome)

Indicate which measure is being obtained in which course by typing “Measure n.n” in the appropriate cell. If you’d rather use a description of the measure, that is fine. Also, indicate the year/semester in which the measure will be obtained (e.g., Fall 2011). Student learning outcomes must be assessed at least once within a 2 ½ year period. Note that a measure does not need to be obtained from every course in which an outcome is covered (see Map #1).

<table>
<thead>
<tr>
<th>Course 1</th>
<th>Student Learning Outcome 1</th>
<th>Student Learning Outcome 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math565-566</td>
<td>Master’s students will demonstrate a good understanding of mathematics after their first year</td>
<td>Master’s students will be able to communicate mathematics in a professional manner.</td>
</tr>
<tr>
<td>Course 2</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Math573-684</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Course 3</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Math587-580</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Course 4</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Math510-511</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Course 5</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Math520-521</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Course 6</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>Math554-555</td>
<td>selected topics on Final Exam</td>
<td></td>
</tr>
<tr>
<td>thesis/project</td>
<td>Rubric for Theses/Projects</td>
<td></td>
</tr>
<tr>
<td>qualifying exam</td>
<td>Rubric for Qualifying Exams</td>
<td></td>
</tr>
</tbody>
</table>
### Employer’s perception about the readiness of our graduates for their jobs

| 1: Not well prepared | 2: adequate | 3: Good | 4: Very good | Excellent |
|----------------------|-------------|---------|--------------|-----------|-----------|
|                      |             |         |              |           |           |
Faculty/student survey about the effect of the seminar on students’ research interests

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Master’s Student</th>
<th>PhD Student</th>
<th>Passed Q-Exam</th>
<th>Will Take Q-Exam</th>
<th>Will NOT take Q-Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students can learn from the talk</td>
<td>Strongly Agree (5)</td>
<td>Agree (4)</td>
<td>Undecided (3)</td>
<td>Disagree (2)</td>
<td>Strongly disagree (1)</td>
</tr>
<tr>
<td>Topics enhances students’ research interest</td>
<td>Strongly Agree (5)</td>
<td>Agree (4)</td>
<td>Undecided (3)</td>
<td>Disagree (2)</td>
<td>Strongly disagree (1)</td>
</tr>
<tr>
<td>Talk opens students’ view on research</td>
<td>Strongly Agree (5)</td>
<td>Agree (4)</td>
<td>Undecided (3)</td>
<td>Disagree (2)</td>
<td>Strongly disagree (1)</td>
</tr>
</tbody>
</table>
### Student’s perception about their readiness for his/her job

<table>
<thead>
<tr>
<th>1: Not well prepared</th>
<th>2: adequate</th>
<th>3: Good</th>
<th>4: Very good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Grading Rubric for Qualifying Exams

<table>
<thead>
<tr>
<th>Number of problems tried in part I</th>
<th>Number of problems solved/proved correctly in part I</th>
<th>Number of problems solved/proved partially correct in part I</th>
<th>Number of problems tried in part II</th>
<th>Number of problems solved/proved correctly in part II</th>
<th>Number of problems solved/proved partially correct in part II</th>
<th>Total score of the exam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Rubric for Theses/Projects

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual fails to meet the required level</td>
<td>Individual not performing at adequate level</td>
<td>Individual performing at satisfactory level</td>
<td>Tasks and goals are being accomplished</td>
<td>Results are outstanding, great accomplishments</td>
</tr>
<tr>
<td>Thesis writing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis presentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis Oral Exam on general knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth of thesis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Topics Evaluated by Tests and Final Exams (see Curriculum Map II)

<table>
<thead>
<tr>
<th>Course 1</th>
<th>Math565-566</th>
<th>Topological spaces and continuity</th>
<th>compact, connected spaces</th>
<th>Product and quotient spaces</th>
<th>Fundamental groups and functors</th>
<th>Singular homology and cellular homology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course 2</td>
<td>Math571-573</td>
<td>Sylow subgroups</td>
<td>Semi-direct products</td>
<td>Nilpotent and solvable groups</td>
<td>Ring theory</td>
<td>Projective modules</td>
</tr>
<tr>
<td>Course 3</td>
<td>Math587-580</td>
<td>Basic Topology of the real Line</td>
<td>Differentiation and Riemann integration</td>
<td>Measure theory and Lebesgue integration</td>
<td>Convergence theorem</td>
<td>LP -spaces</td>
</tr>
<tr>
<td>Course 4</td>
<td>Math510-511</td>
<td>Analysis on errors of numerical solution of systems of linear equation</td>
<td>Eigenvalues, eigenvectors and singular value decomposition</td>
<td>Iterative methods to solve Systems of linear equations</td>
<td>Numerical differentiation and numerical integration</td>
<td>Numerical methods to solve initial value problems of ordinary differential equations</td>
</tr>
<tr>
<td>Course 5</td>
<td>Math520-521</td>
<td>Linear programming and simplex method</td>
<td>Sensitivity analysis</td>
<td>Application to network and transportation</td>
<td>Non-linear programming to constraint and unconstrained optimization problem</td>
<td>Modern search algorithms</td>
</tr>
<tr>
<td>Course 6</td>
<td>Math554-555</td>
<td>Distributions of random variables and moment of random variables</td>
<td>Probability distributions and joint distributions</td>
<td>Order statistics</td>
<td>Asymptotic distributions</td>
<td>Interval estimation and hypothesis testing</td>
</tr>
</tbody>
</table>