

**Texas A&M International University
Core Curriculum Institutional Effectiveness Review (CCIER)**

Core Curriculum Academic Discipline: MATHEMATICS

Assessment Period Covered: Sept. 1, 2011 to May 31, 2012

Discipline Coordinator (Preparer of Report)

Eduardo Chappa

List Other Academic Discipline Faculty:

Dr. Rohitha Goonatilake
Dr. Firooz Khosraviyani
Dr. Runchang Lin
Dr. David Milovich
Dr. Chen-Han Sung
Dr. Qingquan Wu
Mr. Pablo Morales
Mr. Juan Gonzalez
Ms. Dalia Trevino
Ms. Patricia Proa
Ms. Teresa Nguyen

The Core Curriculum Institutional Effectiveness Review supports the following imperative of the Texas A&M International University 2011-2015 Strategic Plan:

Imperative 3: Teaching and Learning-- Enhance the educational environment by promoting excellence in teaching and learning.

Institutional Mission

Texas A&M International University, a Member of The Texas A&M University System, prepares students for leadership roles in their chosen profession in an increasingly complex, culturally diverse state, national, and global society ... Through instruction, faculty and student research, and public service, Texas A&M International University embodies a strategic point of delivery for well-defined programs and services that improve the quality of life for citizens of the border region, the State of Texas, and national and international communities.

Core Curriculum Mission

At Texas A&M International University, the Core curriculum introduces students to academic disciplines which form the foundation of human thought: mathematics, science, history, language, literature, the arts, and social and behavioral sciences. Our Core is conceived to open new areas of learning for our students and to foster skills necessary for success in higher education.

As they move through this course of study, students are encouraged, as their knowledge increases, to develop the capacity to articulate and support a thesis, to think critically, to synthesize their observations and to perceive analogies and relationships between seemingly diverse ideas and intellectual pursuits.

Provide summary of the last cycle's use of results and changes implemented:

The statement should include a concise analysis of the assessment data collected during the previous year, a brief explanation of actions taken to address specific outcomes, an evaluation of how these actions contributed to the improvement of the program, and any recommendations formulated.

The Department of Engineering, Mathematics, and Physics assessed during the 2010-2011 period the following outcomes

1. To apply arithmetic, algebraic, geometric, higher order thinking, and statistical methods to modeling and solving real world situations.
3. To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.

Outcome 5 was also measured, since it was not achieved successfully during the last cycle.

Students enrolled in MATH 1314 (College Algebra) were given a pre-test to measure competency in each outcome. The pre-test was common to all sections of MATH 1314 was designed by a committee of instructors of the course and was given during the fourth week of classes. A post-test was designed by the same instructors and offered during the last week of classes.

The results obtained are summarized in the following table

Educational Objective	Percentage of Students that passed the Pre-Test (C or above)	Percentage of Students that passed the Post-Test (C or above)
1. To apply arithmetic, algebraic, geometric, higher order thinking, and statistical methods to modeling and solving real world situations.	30% (68 out of 228)	89% (180 out of 203)
3. To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.	9% (21 out of 228)	71% (145 out of 203)
5. To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.	6% (14 out of 228)	73% (149 out of 203)

The table shows that most students successfully mastered each of the outcomes, even after considering differences in the samples. We are continuing to give emphasis to these topics in College Algebra as in the past cycle. We will control better this year to not to have differences in the sample of the pre and post test..

Texas Higher Education Coordinating Board Exemplary Educational Objectives for the following academic discipline: MATHEMATICS

1. To apply arithmetic, algebraic, geometric, higher order thinking, and statistical methods to modeling and solving real world situations.

2. To represent and evaluate basic mathematical information verbally, numerically, graphically, and symbolically.
3. To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.
4. To use appropriate technology to enhance mathematical thinking and understanding to solve mathematical problems and judge the reasonableness of the results.
5. To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.
6. To recognize the limitations of mathematical and statistical models.
7. To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.

Section I: Planning and Implementation

Outcome(s):

From the list above, identify the outcome(s) that will be focused upon this year. (It is recommended that academic disciplines rotate through their entire set of Exemplary Educational Objectives over a multi-year period. Thus, disciplines are encouraged to focus only on a few outcomes each year.) To facilitate the completion of this report, please refer to the Core Curriculum Matrix completed for each academic discipline.

The Department will assess outcomes 4, 6 and 7; namely

4. To use appropriate technology to enhance mathematical thinking and understanding to solve mathematical problems and judge the reasonableness of the results.
6. To recognize the limitations of mathematical and statistical models.
7. To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.

☐ **Please indicate if the outcome(s) is (are) related to writing (Write-On TAMIU).**

Methods of assessment to be used:

The explanation should identify and describe the type of assessment(s) that will be used (e.g., survey, questionnaire, observation instrument, test, rubric to evaluate performance, standardized examination, action research, interviews, etc.), who will provide the information, and how the data will be obtained.

Students enrolled in MATH 1314 (College Algebra) will be given a pre-test to measure competency in each outcome. The pre-test will be common to all sections of MATH 1314 and will be designed by a committee of instructors of the course. The pre-test quiz will be given during the fourth week of classes. A post-test will be designed and offered during the last week of classes.

Indicate when assessment(s) will take place:

Assessment will take place on Fall 2011.

Criteria/Benchmark(s) for assessing students' progress in meeting the exemplary objective(s) selected:

For each outcome, from pre-test to post-test there will be an increase of at least 15% in the percentage of students that pass (obtain a C or above) with a minimum of 60% of students that pass the post-test.

Section II: Analysis of Results

What were the results attained?

Describe the primary results or findings from your analysis of the information collected. This section should include an explanation of any strength(s) or weakness(es) suggested by the results.

A pre and post-test was given in all sections of MATH 1314 College Algebra. A total of 496 students, distributed across 15 sections, participated in the pre-test, while a total of 421 students participated in the post-test. The pre-test was conducted during the first three weeks of the course, while the post-test was conducted during the final three weeks of the course. Pre and post tests contained embedded questions contributed by course instructors that measured competency in each of the measured outcomes. There were two questions per outcome, and questions were designed to be independent (answering correctly or incorrectly a question, did not affect the outcome of a different question).

Data distribution varies across different sections; however, the conclusion is consistent among all of them: Students failed the pre-test and passed the post-test. The following table summarizes the results in aggregate form. Some comments on the results that dis-aggregate the data is included in the table as well.

Educational Objective	Percentage of Students that passed the Pre-Test (C or above)	Percentage of Students that passed the Post-Test (C or above)
4. To use appropriate technology to enhance mathematical thinking and understanding to solve mathematical problems and judge the reasonableness of the results.	3% (15 out of 496). Across different sections there was a minimum passing rate of 0% (across 9 sections), and a maximum passing rate of 24% (only one section, no other section was above 10%).	82% (347 out of 421) Across different sections there was a minimum passing rate of 56% (this is the only section below 60%, the benchmark). The maximum passing rate was 100% (10 sections got a passing rate above 70%).
6. To recognize the limitations of mathematical and statistical models.	6% (29 out of 496). Across different sections there was a minimum passing rate of 0% (across 11 sections), and a maximum passing rate of 54% (only one section, 13 sections were below 10%)	82% (346 out of 421) Across different sections there was a minimum passing rate of 60% (right at the benchmark). The maximum passing rate was 98%. All sections increased above 15%.
7. To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.	5% (25 out of 496). Across different sections there was a minimum passing rate of 0% (across 8 sections), and a maximum passing rate of 45% (only one section, all other sections were below 10%)	78% (329 out of 421) Across different sections there was a minimum passing rate of 58% (2 sections were below the benchmark, while other 4 sections were below 70%). The maximum passing rate was 100%. All sections increased above 15%.

What were the conclusions reached?

Include a brief description of the conclusion(s) based on the evidence collected and describe the process used to disseminate the information. Use the Meeting Minutes template found at: <http://www.tamtu.edu/adminis/iep/resources.shtml>. Once completed, submit the minutes to integrate@tamtu.edu.

Data shows that across different sections, students consistently fail the pre-test and pass the post-test. This is consistent with the assessment data for last year. The number of sections with passing rates of 0% in the pre-test shows that students do not have previous knowledge on the topics tested before they are assessed. It is an important question to ask if pre-tests are necessary given this rate of failure. College Algebra students are sensitive to failure, and a pre-test that makes most of them fail might send the wrong message to them, affecting retention rates in College Algebra. In this case, there was a drop of 15% in the number of students that took the post-test in relation to those that took the pre-test. Most sections retained more than 90% of their students between tests (as measured by number of tests taken), but 6 sections failed to retain at least 80% of them. There was a section that dropped 47% in retention between tests.

The passing rates for the post-test show students mastered the topics during the course. Even considering the difference between samples, there was a passing rate above 60% in all outcomes. It seems that among the students that take the pos-test that the passing rate is consistently above 70% (including last year's data), so we should reconsider increasing our target passing rate for each outcome.

Describe the action plan formulated.

Based on the conclusion(s), describe the action plan to be implemented to improve or maintain student learning in the core academic discipline, including a timeline for implementation.

While every year we concentrate on different outcomes, we will continue working to maintain the success achieved in these outcomes. We will make an effort to compare students that took both tests instead of comparing samples, and reconsider the method of assessment (one test vs. pre and post-test), as well as the benchmark for future assessments.

Section III: Resources

Resource(s) to implement action plan:

Describe the resources that will be needed to implement the action plan. Also indicate if the resources are currently available, or if additional funds will be needed to obtain these resources.

Funding

- ☐ New Resources Required
- ☐ Reallocation of current funds

Physical

- ☐ New or reallocated space

Other

- ☐ Primarily faculty/staff time

- ☐ University/rule procedure change only

Provide a narrative description and justification for requested resources (include linkage to Strategic Plan)

N.A.

Date Report Submitted:

Section I, November 17, 2011
Sections II and III, May 17, 2012