IFP Course Report

Course: _____Math (See list below)_____

Term: _____AY2015-2016_____

Person Submitting Report: _____Susan Moosai_____

MAC1105: College Algebra
MAC1114: Trigonometry
MAC1140: Precalculus Algebra
MAC2233: Methods of Calculus
MAC2311: Calculus with Analytic Geometry 1
MAC2312: Calculus with Analytic Geometry 3
MGF1106: Mathematics for Liberal Arts 1
MGF 1107: Mathematics for Liberal Arts 2
PHI2102: Introductory Statistics

1. **Learning Outcomes and Assessment(s)** (What is being used to assess IFP outcomes?)

IFP SLO	Assessment
identify and explain mathematical theories and their applications.	embedded questions in exams.
determine and apply appropriate mathematical and/or computational models and methods in problem solving.	embedded questions in exams.
display quantitative literacy.	embedded questions in exams.

2. **Description of the Assessment** (What type of assessment is it? If multiple choice test, how many items are being used for each SLO? If it is a performance assessment, what rubric factors or scoring criteria are being used?)

    The Assessment Committee for IFP met at the beginning of the academic year 2015-2016 to discuss embedded questions and to ensure that these questions were meeting the learning objectives. Coordinated courses were represented by course coordinators. Specifically, e-mails were exchanged, and individual meetings were held with the individual course coordinators and the chair of the Assessment Committee for IFP. Following the end of the spring 2016 semester, emails were exchanged, and the final results presented below are the consensus of the individual course coordinators, as well as the Assessment Committee for IFP.

    Students' understanding of mathematical theories and their applications will be measured with embedded questions in exams. If the same embedded questions are used for more than one outcome, the linkage will be explained in the results. Also, it is expected that the embedded questions will cover all outcomes. If this is not the case, then it will be noted with the questions. (MAC 1147, being the union of MAC 1114 and MAC 1140, will use the combined embedded questions of these two courses.)

Examinations in each of the selected courses will include embedded questions from the questions pool, and the students' performance on these items will be used to determine whether the program has reached its criterion for success. Students will not be informed as to which are the embedded questions. If the course does not have a comprehensive examination, embedded questions will be used throughout the term on examinations.

The question pool and student learning outcomes will be evaluated annually by the faculty teaching the course, as assessment data become available. A separate departmental committee (Assessment Committee for IFP) will periodically review and analyze assessments and learning outcomes and then make recommendations on how to improve student learning outcomes, the course, and the intellectual foundations and quantitative analysis program.

Embedded question pools were revised slightly over past year, due to change in textbook and mathematics software in certain courses (as noted above). See the attached file "Embedded Questions and Learning Outcomes" for a mapping relating the embedded questions to learning outcomes for each of the courses and their embedded questions.

3. **Scoring** (How is student performance being scored? What are the "above," "at," and "below" cutoffs for individual student performance?)

   In each of the courses, the average score will be 60% initially to grow over time to 80%, as we reevaluate the embedded questions and improve preparation. Data results will be used as a basis for improving student learning outcomes, courses, and programs.

4. **Sample** (Who is being tested and why? Are you testing all sections? All students? How is your sample representative?)

   All students enrolled in the courses listed.

5. **Results** (Report percentages of students "above," "at," and "below" cutoffs for each course. You may combine data from multiple sections for each course.)

Course		SLO #1		SLO#2		SLO#3		
		At/Above	Below	At/Above	Below	At/Above	Below	n
MAC 1105	Fall 15	72.85%	27.15%	73.33%	26.67%	86.10%	13.90%	180
	Spring 16	66.66%	33.34%	81.67%	18.33%	90.50%	9.50%	810
MAC 1114	Fall 15	54.19%	45.81%	60.61%	39.39%	67.45%	32.55%	167
	Spring 16	67.84%	32.16%	60.43%	39.57%	39.36%	60.64%	114
MAC 1140	Fall 15	60.48%	39.52%	58.91%	41.09%	63.59%	36.41%	207
	Spring 16	59.65%	40.35%	54.79%	45.21%	71.13%	28.87%	173
MAC 1147	Fall 15	77.66%	22.34%	56.25%	43.75%	54.64%	45.36%	69
	Spring 16	58.83%	41.17%	58.46%	41.54%	47.74%	52.26%	33
MAC 2233	Fall 15	55.00%	45.00%	58.00%	42.00%	52.00%	48.00%	373
	Spring 16	60.20%	39.80%	58.02%	41.98%	51.37%	48.63%	321
MAC2311	Fall 15	48.00%	52.00%	74.50%	25.50%	84.50%	15.50%	52
	Spring 16	54.00%	46.00%	35.00%	65.00%	8.00%	92.00%	26
MAC2312	Fall 15	NA	NA	NA	NA	NA	NA	
	Spring 16	71.20%	28.80%	72.35%	27.65%	54.70%	45.30%	104
MGF1106/ MGF1107	Fall 15	NA	NA	NA	NA	NA	NA	
	Spring 16	NA	NA	NA	NA	NA	NA	
PHI 2102	Fall 15	NA	NA	NA	NA	NA	NA	
	Spring 16	NA	NA	NA	NA	NA	NA	
STA 2023	Fall 15	NA	NA	NA	NA	NA	NA	
	Spring 16	85.00%	15.00%	74.00%	26.00%	68.00%	32.00%	709

Refer to the file "EQR SUMMARY FY 2015-2016 ALL" for details on each course and question, as well as historical information.

In MAC 1105, outcome #1 had 73% correct in fall 2015 and 67% correct in spring 2016; outcome #2 had 73% correct in fall 2015 and 82% correct in spring 2016; and outcome #3 had 86% correct in fall 2015 and 91% correct in spring 2016. All sections were on a 2 + 2 model, in which students had 2 hours of lecture per week and were required to spend 2 hours per week in the computer lab, where they could receive immediate help and feedback. Both the fall and spring results met the criterion for success, but there was a noticeable decline from fall to spring; this decline seems hard to explain. The committee decided that no action is needed at this time, since it appears that MAC 1105 is meeting the expectations on all 3 outcomes.

In MAC 1114, outcome #1 had 54% correct in fall 2015 and 68% correct in spring 2016; outcome #2 had 61% correct in fall 2015 and 60% correct in spring 2016; and outcome #3 had 67% correct in fall 2015 and 39% correct in spring 2016. All sections were on a 2 + 2 model, in which students had 2 hours of lecture per week and were required to spend 2 hours per week in the computer lab, where they could receive immediate help and feedback. The criterion for success was met for all outcomes in at least one of the two semesters and was close in both semesters. The committee decided that no action is needed at this time.

In MAC 1140, outcome #1 had 61% correct in fall 2015 and 60% correct in spring 2016; outcome #2 had

59% correct in fall 2015 and 55% correct in spring 2016; and outcome #3 had 64% correct in fall 2015 and 71% correct in spring 2016. All sections were on a 2 + 2 model, in which students had 2 hours of lecture per week and were required to spend 2 hours per week in the computer lab, where they could receive immediate help and feedback. All outcomes were close to meeting the criterion for success, and there was little variation between semesters. The committee decided that no action is needed at this time.

In MAC 1147, outcome #1 had 78% correct in fall 2015 and 59% correct in spring 2016; outcome #2 had 56% correct in fall 2015 and 59% correct in spring 2016; and outcome #3 had 55% correct in fall 2015 and 48% correct in spring 2016. All sections were on a 3.5 + 2 model, in which students had 3.5 hours of lecture per week and were required to spend 2 hours per week in the computer lab, where they could receive immediate help and feedback. All outcomes were close to meeting the criterion for success except outcome #3 in the spring semester, for which no explanation was available. The committee decided that no action is needed at this time.

In MAC 2233, outcome #1 had 55% correct in fall 2015 and 60% correct in spring 2016; outcome #2 had 58% correct in fall 2015 and 58% correct in spring 2016; and outcome #3 had 52% correct in fall 2015 and 51% correct in spring 2016. The criterion for success was clearly not met for all outcomes except outcome #1 in the spring semester, for which no explanation was available. The committee decided that these results needed to be looked into further for the upcoming year.

In MAC 2311, outcome #1 had 48% correct in fall 2015 and 54% correct in spring 2016; outcome #2 had 75% correct in fall 2015 and 35% correct in spring 2016; and outcome #3 had 85% correct in fall 2015 and 8% correct in spring 2016. The criterion for success was clearly not met for all outcomes except outcome #3 in the fall semester, for which no explanation was available. The committee decided that these results needed to be looked into further for the upcoming year.

In MAC 2312, outcome #1 had 71% correct in spring 2016; outcome #2 had 72% correct in spring 2016; and outcome #3 had 55% correct in spring 2016. No results were ever collected for Fall semester. The criterion for success was met in the spring except for outcome #3, in which it was nearly met. The committee noted that this is not a coordinated course and does not have common exams; the committee recommends to the department chair that some level of coordination (including a common final exam) be initiated in the near future.

In MGF 1106 and MGF 1107, no data was available for fall 2015 or spring 2016. In the fall semester, this was due in large part to the fact that instructors were not coordinated and as such no embedded questions were ever included in their finals.

The committee has decided that these two courses should be coordinated (as most other mathematics courses in the IFP) and recommends to the department chair that a coordinator be appointed.

PHI 2102, Logic, No data is available. As this course was offered by another department (in another college), the committee did not assess the results.

In STA 2023, outcome #1 had 67% correct in fall 2015 and 85% correct in spring 2016; outcome #2 had 89% correct in fall 2015 and 74% correct in spring 2016; and outcome #3 had 59% correct in fall 2015 and 68% correct in spring 2016. All sections were on a 2 + 2 model, in which students had 2 hours of lecture per week and were required to spend 2 hours per week in the computer lab, where they could receive

immediate help and feedback. STA 2023 underwent change in textbook and mathematics software during the 2014-2015 academic year, so some variation over the previous year's results was expected. The criterion for success was clearly met (and exceeded) for all outcomes except outcome #3 in the fall semester, which was close to meeting the criterion. The committee decided that no action is needed at this time.

6. **Action** (What do the results mean to you?)

<u>Recommendations for Improving Assessment Processes</u>.

The committee discussed the continued use of practice tests to ensure students get an early feel of time and implied pressure that they might experience on an exam or the final. Assigning practice tests for credit and ensuring that help is available is currently being considered. These tests should be designed to be slightly longer and harder than the actual exam. Requiring that students achieve a certain score on the practice tests might help improve performance and was discussed by the committee. Getting students started early on doing homework is crucial, and stratagems for accomplishing this were discussed.

Review sessions for exams are still scheduled on a course-by-course basis. The committee discussed working with the Math Learning Center to implement general reviews outside of the classroom for midterm exams in all IFP mathematics courses.

<u>Recommendations for Improving Student Learning</u>.

The shift to the 2 + 2 format in many courses seems to have been successful, but more work is needed in order to meet the criterion for success consistently, and thereby attain the desired program improvements. This is the second year the department has begun offering MAC 2233 in the 2 + 2 format, although sufficient computer lab space has been difficult to find, and an unintended consequence has been a large reduction in "open lab hours" available to students in other courses. The MLC has a SAM lab dedicated t this course which has a high DFW rate. Coordination of MAC 2233 in the new format is challenging due to the large number of sections of this course. The committee is constantly working on improving and revisiting this course to meet the outcome expectations and drive down the DFW rate.

Placement in the proper course unquestionably contributes to student success. ALEKS placement test scores are now being strictly enforced for enrollment in lower division mathematics courses, which has helped to alleviate some placement problems. Instructors in many courses have begun administering an additional assessment exam during the first week of class, in order to alert students with inadequate background that they might be in need of more preparatory work. In order to accommodate struggling students who have already passed the prerequisite course, last year the mathematics department offered "mathematics boot camps" before the start of each semester. These boot camps were run through the engineering college and had small enrollment, but feedback from participating students was positive. In the current year, the science college has taken over management of the boot camps, and they are offered near the beginning of the semester for students already enrolled in courses but needing preparatory work. Enrollment in the boot camp in the current semester was again small, but the department is hopeful that the participating students will be successful in their current

classes. Follow-up data is needed.

MAC 1140, MAC 1114, and MAC 1147 were reworked (change of software, textbooks, and format of course), and results appear to be very promising. The committee does not advocate further changes at this time but would like to see another year of data to make sure that the improvements continue. STA 2023 was also extensively reworked (change of software, textbooks, and format of course as well), and results appear to be very good (especially in spring). The committee is pleased with the current structure of the course.

 The committee noted that online sections of IFP courses frequently have lower success rates than on-campus classes. Course coordinators are already overworked with the on-campus classes and have little time to devote to online sections which have different needs. The committee recommends that the department chair appoint a separate eLearning coordinator who can work with instructors in online classes and facilitate help from FAU's eLearning office.

To better support the learning outcomes of the general education curriculum, the committee recommends adding material on ethics: best statistical application for analysis and interpretation of statistical results. This topic could be discussed in MGF 1106 during an introduction to statistical analysis and more fully handled in STA 2023. Students could be reminded of the need to interpret and present results in an intellectually honest manner; perhaps a unit on the "use and misuse of statistics" could be added to these courses. The chair of the Assessment Committee for IFP will meet with the course coordinators to initiate discussions.

7. **Attachments** (e.g., rubric, sample items)
   Sample items and data files are available on the Core Curriculum Committee V: drive and are available upon request.