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Course Outcomes Guide (COG)

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Course Title: Math 203, Calculus I   **Date:** Fall 2015

Course Team: Jennifer Szczesniak

Expected Learning Outcomes

General Education Outcomes:
Upon successful completion of this course students will be able to:
1. Apply mathematical methods involving arithmetic, algebra, geometry, and graphs to solve problems.
2. Represent mathematical information and communicate mathematical reasoning symbolically and verbally.
3. Interpret and analyze numerical data, mathematical concepts, and identify patterns to formulate and validate reasoning.

Course Outcomes:
In this course students will acquire:

1) **TECHNICAL COMPETENCY** in the methods of calculus that will enable them to find limits, derivatives and integrals of algebraic and transcendental real-valued functions of a single variable and to recognize the setting in which the result applies. *(Supports Mathematics Program Outcomes 1 and 5)*

2) **CONCEPTUAL UNDERSTANDING** of limits, continuity, differentiation and integration and the theorems that relate these topics.   Conceptual understanding will be developed by requiring students to view and understand these topics and their related theorems from numeric, geometric, algebraic and written/verbal perspectives. **(The Rule of Four).** *(Supports Mathematics Program Outcomes 1, 2, 4 5, 6 and 7)*

3) **UTILITY** in the methods of calculus. Students will use calculus to solve applied problems from a variety of disciplines ranging from biology, economics, business, engineering, and the social sciences, but primarily focusing on applications from physics and mathematics. *(Supports Mathematics Program Outcomes 1, 2, 4, 5, 6 and 7)*

Assessment
The assessment tool is a series of 12 questions, 10 multiple choice and 2 open-ended. These questions are all retired AP A/B or B/C Calculus test questions. Each question has data to indicate how AP test students did on the question which we will use as a benchmark.

Validation
As stated above, all questions now come from a benchmarked source.

Results
As seen in the table below, our results seemed to hover around the same level as the benchmark. The summer sessions scored lower, as was the trend with the legacy data as well. When the new tool was pushed out to the local high schools offering the class as a dual enrollment option, the assessment scores dropped below the benchmark. Looking at the data broken down by section, it is clear that those taking the test at the high school were performing at a lower rate than those taking the class on campus. Over the course of the 2014-2015 academic year, students taking the class in a local high school received an average grade of 3.31 and scored an average of 5.80 points on the common assessment tool. Students taking the course at HCC received an average grade of 2.70 and scored an average of 11.77 points on the common assessment.

Follow-up
While a trial of using an open-source online homework tool is ongoing, it may benefit students to have access to such a tool across all sections of MAT 203. This would standardize the course similarly to how it is done in MAT 101, allowing for some more input on our end into the high school classroom.

Faculty will also try to address the issue of the lower scores in the summer sections. Discussions will be had to address possible causes and solutions.

One thing that may be worthwhile is breaking the learning outcomes out into specific areas. Each outcome contains derivatives and integrals so breaking those out as separate items may be more helpful in determining where students are having difficulties.

Budget Justification

No budget resources are immediately anticipated.

Course: MAT 203   SLOA Data

	13/FA	14/SP	14/SU	14/FA	15/SP
# Active students	52	46	15	60	44
%W	1.9	0	0	3.3	4.5
*% walk-away Fs No final exam/grade = F	7.7	13	6.7	5	4.5
% Success (A,B,C)	86.5	82.6	60	83.3	75
Common Comprehensive Final Exam Score (Benchmark: 12.59)	12.42~	13.71~	10.5	10.52	11.9
Mean course grade	2.78	2.70	2.27	2.90	2.62
Item Analysis **Weakest Content Areas**	SLO 2	SLO 1	SLO 2	SLO 2	SLO 3

*% Walk-away Fs = Did not take the final exam and received a grade of F.

~ Do not include students taking the course at the local high schools as part of the dual enrollment program.