## Course Outcomes Guide (COG)

**Course Title:**  Math 203, Calculus I                    **Date:**  May 2017

**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. These questions are all taken from the no-calculator portion of the AP exams.

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

**Results**
As seen in the table below, our results traditionally hover around the same level. 16/FA was abnormally low and dropped in both sections, as did the mean course grade. This could be based on the attempt to use a new homework program and replace some paper assignments. This could also indicate a change in the student populations in the fall semester.

**Follow-up**
- At this point in time I am abandoning the use of online homework in MAT 203. The trials I have done with Webwork (my sections in 15/FA and 16/SP) and MapleTA (both sections in 16/FA) have shown no student benefits and have overburdened me.

- Taking the online homework development off of my plate will allow time to begin the transition of the Calculus series (MAT 203, MAT 204 and MAT 205) to open-source textbooks.

- We will continue to monitor the scores for the fall populations to see if we can attribute the change in scores to the online assessments or if there was a shift in the preparedness of the students enrolling during the fall.

**Budget Justification**

No budget resources are immediately anticipated.

**Course:  MAT 203**          **SLOA Data**

| | 14/SU | 14/FA | 15/SP | 15/SU | 15/FA | 16/SP | 16/SU | 16/FA | 17/SP |
|---|---|---|---|---|---|---|---|---|---|
| # Active students | 15 | 60 | 44 | 21 | 37 | 43 | 19 | 45 | 44 |
| %W | 0 | 3.3 | 4.5 | 0 | 5.4 | 4.7 | 5.3 | 4.4 | 4.5 |
| *% walk-away Fs<br>No final exam/grade = F | 6.7 | 5 | 4.5 | 4.8 | 0 | 7 | 0 | 2.2 | 0 |
| % Success<br>(A,B,C) | 60 | 83.3 | 75 | 71.4 | 83.8 | 76.7 | 84.2 | 68.9 | 77.3 |
| Common Comprehensive Final Exam Score<br>(Benchmark: 12.59) | 10.5 | 10.52 | 11.9 | 10.58 | 10.8 | 10.76 | 12.00 | 7.91 | 10.00 |
| Mean course grade | 2.27 | 2.90 | 2.62 | 2.29 | 3.09 | 2.61 | 3.06 | 2.33 | 2.71 |
| Item Analysis **Weakest Content Areas** | SLO 2 | SLO 2 | SLO 3 | SLO 1 | SLO 2 | SLO 3 | SLO 3 | SLO 2 | SLO 2 |

*% 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.