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Course Outcomes Guide (COG)
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Directions: Please complete this form to document your progress toward improving student learning. For each item, indicate your progress and your anticipated next steps. Thank you!

Course Title: Math 203, Calculus I   **Date:** May 2013

Course Team: Jennifer Szczesniak, Christopher Lewis

Expected Learning 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 common assessment that was developed by the math department consists of six problems that test the learning outcomes of technical competency, conceptual understanding, and utility in the methods of calculus.

Starting in Fall 2013, the assessment tool will be revised. It will possibly be administered as a separate assessment.

Validation

The common assessment tests student achievement of the learning outcomes, which are directly correlated with over 50 content objectives on the topical outline of the common syllabus.

Validity to a large part is then determined by the appropriateness of the topics and the content objectives for the topics. For this reason a contemporary, widely used, comprehensive, and highly regarded text by James Stewart was selected for the course. The emphasis is on understanding concepts, an outgrowth of the current calculus reform movement.

Starting in Fall 2013 the assessment tool will be revised. The new questions on the assessment will come from sources with national data available such as retired Praxis, AP Calculus, GRE subject, and SAT subject exams. Results can then be benchmarked against a national average.

Results

Question	1	2	3	4	5	6	Average
Fall 2010	44	67	67	58	41	40	53
Sp 2011	62	70	75	67	60	55	65
Fall 2011	70	78	81	79	72	69	75
Sp 2012	79	83	89	86	87	82	85
Sum 2012	80	66	65	70	43	39	61
Fall 2012	69	79	86	84	81	81	80
Sp 2013	64	77	69	61	65	79	70

Follow-up

Results have been discussed by the math faculty and are available to the instructors teaching Math 203. Scores in all six questions have improved since the common assessment was first administered in Fall 2010.

Results indicate that students are now achieving average to above average comprehension of all student learning outcomes. The weakest area is student learning outcome 2 - conceptual understanding. This is not surprising since mastery of this outcome requires understanding content from multiple perspectives to solve problems that require deeper comprehension then mere symbolic manipulation. These problems also require interpretive skills, including written explanations to justify results.

Results for future summer offering should be carefully monitored. Based on the results of Summer 2012, it appears that summer students are not mastering the outcomes as well as students that take Math 203 during the Fall and Spring semesters. This might be due to the abbreviated 8 week offering during the summer. Perhaps summer offerings should be extended to at least 10 weeks. Lower results might also be due to enrollment of under-prepared students during the summer.

Budget Justification

No budget resources are immediately anticipated, although there may be some cost associated with obtaining assessments that are benchmarked..

Course: MAT 203   SLOA Data
Faculty Team

	FA 2010	SP 2011	SU 2011	FA 2011	SP 2012	SU 2012	FA 2012	SP 2013	SU 2013
# Active students	44	30	33	43	24	14	40	24	
%W	6.8	6.7	6.1	11.6	0	7.1	2.5	0	
*% walk-away Fs No final exam/grade = F									
% Success (A,B,C)	93.2	80	62.5	81	91.7	85.7	78.9	100	
Common Comprehensive Final Exam Score	53	65		75	85	61	80	70	
Mean course grade	3.4	2.82	2.17	2.97	2.84				
Item Analysis **Weakest Content Areas**	SLO 2	SLO 2	SLO 2	SLO 2	SLO 2	SLO 2 & 3	SLO 2	SLO 2	

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