## Course Outcomes Guide (COG)

**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:** Fall 2011

**Course Team:** 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 (**How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)

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

**Validation (**What methods have you used or will you use to validate your assessment?)

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.

**Results** (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)

The data has been analyzed and general observations have been made.

**Follow-up (**How have you used or how will you use the data to improve student learning?)

Results have recently been discussed by the math faculty and recommendations will be made to the instructors of calculus for the purpose of improving instruction. The common assessment will be re-administered Fall 2011. Results will be analyzed to see if improvements have been made.

**Budget Justification** (What resources are necessary to improve student learning?)

No budget resources are anticipated.