Department: MATHEMATICAL SCIENCES   Semester Hours: 3

Course Title and Number: MATH 211   Calculus for Business and Social Science

An elementary treatment of topics from differential and integral calculus, with applications in social science and business. Students may receive credit for both MATH 211 and MATH 229, but only one of them will count toward the minimum number of hours required for graduation. Not used in major or minor GPA calculation for mathematical sciences majors or minors.

PRQ: MATH 110 with a grade of C or better, or previous credit in MATH 211, or satisfactory performance on the Mathematics Placement Test.

Course Objectives:

- To understand and connect concepts of the calculus with real world problems especially related to Business and Social Science.

- To value mathematics and develop an ability to communicate mathematics, both in writing and orally.

- To develop mathematical reasoning, and an ability to solve problems.

- To attain computational facility in differential calculus.

    (More detailed objectives appear in the Assessment Appendix.)

Content:

- Preliminary topics: A short review of pre-calculus, inequalities, absolute values; Cartesian coordinates, circles, straight lines.

- Functions: domains, graphs; The algebra of functions, composition; mathematical models.

- Limits and continuity: Geometric understanding of the definition of limit; one-sided limits, infinite limits; properties of limits; continuity, properties of continuous functions; Intermediate value theorem.

- Derivatives: The derivative as a limit; derivatives of polynomials, products, powers, and quotients of functions, the chain rule; higher-order derivatives.

- Applications of derivatives: Curve sketching, concavity, points of inflection, asymptotes; maxima and minima (including applications), rates of change versus average change.

- Exponential functions and logarithms: Definitions and algebraic properties; calculus properties; applications involving exponential growth and decay, continuously compounded interest, carbon-dating.

- Integration: Indefinite integrals; rules of integration; substitution; definite integrals; the area under a curve; the area between several curves; the Fundamental theorem of calculus.

Course Requirements: Written explanation of problem solutions and writing involving concepts. Discussion involving concepts and problem solutions in class settings. Competency in the computational aspects of the course. Solutions of problems representing applications of the calculus to other disciplines.

Assessment Instruments: Competency examination on computational facility and the understanding of concepts. Homework problem and writing assignments. Short quizzes. Hour examinations. Final examination.

Current Textbook: Tan, **Applied Calculus for the Managerial, Life, and Social Sciences** 10th Edition, Cengage Learning, 2015.