Course: Math 2043   Survey of Calculus

Catalog Description:
A survey and applications course in calculus designed for students in business, life sciences and social sciences. Topics include differentiation, curve sketching, exponential and logarithmic functions with applications, integration, and multivariable calculus.

Prerequisite:
A grade of "C" or better in College Algebra (MATH 1204); a score of 24 – 28 on the math portion of the ACT; or a score of 46 – 99 on the College Algebra section of the COMPASS.

Credit/Contact/Load hours: 3 credit hours/ 3 contact hours/ 3 load hours

Target Audience and Transfer:
This course is targeted primarily at students in business and life or social sciences. It is required of some AAS and AS degrees as well as a variety of four-year programs. It transfers as 3 credit hours of business calculus.

Course Outcomes:
Upon successful completion of Survey of Calculus, a student should be able to do the following. Other skills may also be required.

1.   Algebraically, analytically, and graphically evaluate limits.

2.   Find basic derivatives using the definition, product, quotient and chain rules, and by implicit differentiation.

3.   Understand and apply derivatives appropriately to real-world problems to optimize functions and to find instantaneous rates of change, marginal cost, marginal profit, relative rates of change, elasticity of demand, etc.

4.   Graph functions by hand, including manually finding the extrema using the first derivative test, intervals where the graph is increasing and decreasing, and finding points of inflection.

5.   Integrate "basic" integrals including polynomial functions, natural exponential functions, and ones requiring basic u-substitutions.

6.   Apply integrals appropriately to find the areas under and between curves, average value, accumulated value, consumer's surplus and producer's surplus.

7.   Find partial derivatives and use them to optimize functions of several variables, including using constrained optimization and Lagrange Multipliers.

Required Text: *Calculus and Its Applications*, 10th edition, Bittinger, Ellenbogen and Surgent, Addison-Wesley, 2012
Required Content:

Section	Topic
1.1	Limits: A Numerical and Graphical Approach
1.2	Algebraic Limits and Continuity
1.3	Average rates of change
1.4	Differentiation Using Limits or Difference Quotients
1.5	Differentiation Techniques: The Power and Sum-Difference Rules
1.6	Differentiation Techniques: The Product and Quotient Rules
1.7	The Chain Rule
1.8	Higher Order Derivatives
2.1	Using First Derivatives to Find Maximum and Minimum Values and Sketch Graphs
2.2	Using Second Derivatives to Find Maximum and Minimum Values and Sketch Graphs
2.4	Using Derivatives to Find Absolute Maximum and Minimum Values
2.5	Maximum-Minimum Problems
2.7	Implicit Differentiation and Related Rates
3.1	Exponential Functions
3.2	Logarithmic Functions
3.6	Elasticity of Demand
4.1	Antidifferentiation
4.2	Antiderivatives as Areas
4.3	Area and Definite Integrals
4.4	Properties of Definite Integrals
4.5	Integration By Substitution
5.1	Consumer Surplus and Producer Surplus

Note: A variety of application problems from each required topic should be assigned

Optional Sections:
Chapter "R", 2.3, 2.6, 3.3, 3.4 (*3.3 and 3.4 are college algebra topics), 3.5, 4.6, 4.7, 5.3 – 5.6, 6.4,
Required Instructional Activities:

The content of the course should be taught with graphing calculators as an available tool when appropriate.

Required Forms of Assessment:
As part of our departmental outcomes assessment program, each instructor must include six departmental questions on his or her final exam. These questions will relate to the General Course Objectives and the Departmental Final Exam Review. These six questions should be evenly weighted on the final and should comprise at least 10% of each student's overall grade for the course. The questions will be graded using a departmental grading rubric utilizing a 10-point scale. Instructors are required to fill out a report for each of their classes listing the score of each individual student on each of the six departmental questions. *Please note that the only resource other than a graphing calculator allowed for use by students during the final exam will be a departmental formula sheet for survey of calculus. It is also a departmental policy that no TI-89 or TI-92 or comparable calculators be allowed for use during the final exam.*

Instructor Resources:

1.   Instructor's Solutions Manual

2.   Computerized Test Bank

3.   WebAssign – online homework delivery system

Student Resources:

1.   Free tutoring at the Learning Lab

2.   Student Solutions Manual

3.   DVD Lecture Series available through the NWACC library

4.   Microsoft Excel Guide

5.   WebAssign