COLLEGEWIDE COURSE OUTLINE OF RECORD

MATH 211 CALCULUS I

COURSE TITLE: Calculus I
COURSE NUMBER: MATH 211
PREREQUISITES: Demonstrated competency through appropriate assessment or successful completion of MATH 131 Algebra/Trigonometry I and MATH 132 Algebra/Trigonometry II or MATH 133 College Algebra with Analytic Geometry and MATH 134 Trigonometry or MATH 136 College Algebra and MATH 137 Trigonometry with Analytic Geometry
SCHOOL: Liberal Arts and Sciences
PROGRAM: Liberal Arts
CREDIT HOURS: 4
CONTACT HOURS: Lecture: 4
DATE OF LAST REVISION: Fall, 2011
EFFECTIVE DATE OF THIS REVISION: Fall, 2016

CATALOG DESCRIPTION: Reviews the concepts of exponential, logarithmic and inverse functions. Studies in depth the fundamental concepts and operations of calculus including limits, continuity, differentiation including implicit and logarithmic differentiation. Applies differential calculus to solve problems in the natural and social sciences, to solve estimation problems and to solve optimization problems. Applies differential calculus to sketch curves and to identify local and global extrema, inflection points, increasing/decreasing behavior, concavity, behavior at infinity, horizontal and vertical tangents and asymptotes, and slant asymptotes. Applies the concept of Riemann sums and antiderivatives to find Riemann integrals. Applies the fundamental theorem of calculus to solve initial value problems, and to find areas and volumes and the average values of a function.

MAJOR COURSE LEARNING OBJECTIVES: Upon successful completion of this course the student will be expected to:

1. Solve problems using the fundamental properties of the elementary functions.
2. Solve problems using the fundamental concept of inverse functions.
3. Calculate the limit of a function at a point or at infinity using the limit laws.
4. Use limits to find asymptotes.
5. Find the points at which a function is continuous or discontinuous.
6. Use the rules of differentiation to find the first and higher order of derivatives of elementary functions.
7. Find the derivatives of inverse functions.
8. Use implicit differentiation and logarithmic differentiation to find derivatives.
9. Apply differential calculus to solve problems in the natural and social sciences
10. Determine if a given function satisfies the hypotheses of Rolle's Theorem and the mean value theorem.
11. Apply the mean value theorem to solve estimation problems.
12. Apply differential calculus to solve optimization problems.
13. Apply L'Hôpital's rule to calculate limits.

14. Apply differential calculus to sketch curves and to identify local and global extrema, inflection points, increasing/decreasing behavior, concavity, behavior at infinity, horizontal and vertical tangents and asymptotes, and slant asymptotes.
15. Find antiderivatives of elementary functions.
16. Calculate definite integrals as the limit of Riemann sums
17. Calculate definite integrals by evaluating antiderivatives.
18. Use the fundamental theorem of calculus to solve initial value problems.
19. Use the fundamental theorem of calculus to find areas between curves, volumes of solids, volumes of solids by cylindrical shells and the average value of a function

COURSE CONTENT: Topical areas of study include --

Functions
Continuity
Limits
Derivatives
Rules of differentiation
Logarithmic differentiation
Implicit differentiation
Higher order derivatives
L'Hôpital's rule
Local and global extrema
Optimization
Rolle's theorem
The mean value theorem
Antiderivatives
Riemann sums
The fundamental theorem of calculus
Initial value problems
Areas and volumes
The average value of a function

CURRENT STATEWIDE GRADING SCALE

A	90 – 100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

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