COURSE OUTLINE OF RECORD

Number: MATH A140 **TITLE:** Business Calculus

ORIGINATOR: Tab Livingston **EFF TERM:** Fall 2014

FORMERLY KNOWN AS: **DATE OF OUTLINE/REVIEW:** 03-02-2016

CROSS LISTED COURSE: **TOP NO:** 1701.00

CID:

SEMESTER UNITS: 4.0

HRS LEC: 90.0 **HRS LAB:** 0.0 **HRS OTHER:** 0.0

CONTACT HRS TOTAL: 90.0

STUDY/NON-CONTACT HRS RECOMMENDED: 126.0

CATALOG DESCRIPTION:

Analytic geometry and limits; introduction to differential and integral calculus with applications to include polynomial, rational, exponential and logarithmic functions and their graphs. Multivariate calculus to include partial differentiation, multiple integration. Introduction to the calculus of probability with applications. May be taken for grades or on a pass-no pass basis. Transfer Credit: CSU; UC.

JUSTIFICATION FOR COURSE:

Comparable to UC and CSU courses

PREREQUISITES:

- Appropriate OCC Math Placement Score or
- MATH A115: College Algebra with a minimum grade of C or better
  or
- MATH A155: Finite Mathematics with Applications with a minimum grade of C or better
  or
- MATH A170: Precalculus with a minimum grade of C or better

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:

Mathematics

MATERIAL FEE: Yes [ ] No [X] Amount: $0.00

CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]

GRADING POLICY: Pass/No Pass [X] Standard Letter [X] Not Graded [ ]

OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]

TRANSFER STATUS: CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]

BASIC SKILLS STATUS: Yes [ ] No [X] **LEVELS BELOW TRANSFER:** Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [ ] NUMBER REPEATS:

REQUIRED FOR DEGREE OR CERTIFICATE: No [ ] Yes [X]

BUSINESS APPLICATION DEVELOPMENT(Certificate of Achievement)
BUSINESS APPLICATION DEVELOPMENT(Associate in Science)
Business Administration(Certificate of Achievement)
Business Adminstration(Associate in Science for Transfer)
COMPUTER INFORMATION SYSTEMS(Associate in Science)

COMPUTER INFORMATION SYSTEMS(Certificate of Achievement)

GE AND TRANSFER REQUIREMENTS MET:

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

2A: Mathematic

CSU GE Area B: Scientific Inquiry and Quantitative Reasoning

B4 - Mathematics/Quantitative Thinking

OCC AA Gen Ed

AREA A2: LANGUAGE AND RATIONALITY - Communication and Analytical Thinking

OCC AS Gen Ed

AREA A2 – ENGLISH COMMUNICATION - Communication and Analytical Thinking

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Explain concepts of differentiation and integration using analytical, graphical, and numerical methods.
2. Use rules and concepts of derivatives to solve applied problems.
3. Use concepts and methods of integration to solve applied problems.

COURSE OBJECTIVES:

1. Manipulate polynomial, exponential and logarithmic functions.
2. Find standard types of limits for rational, exponential and logarithmic functions.
3. Find derivatives of polynomials, rationals, exponentials and logarithmic functions.
4. Use product, quotient and chain rule to find derivatives.
5. Use derivative rules to find maximums or minimums in applications.
6. Use limits and derivatives to sketch rational, exponential and logarithmic functions.
7. Find antiderivatives for rational, exponential and logarithmic functions using substitution and parts.
8. Use integrals in applications.
9. Maximize, minimize and find volumes in three dimensions.
10. Apply calculus in applications involving probability distributions.
11. Apply numerical techniques to find solutions to equations and area under a curve.

COURSE CONTENT:

LECTURE CONTENT:

A. Manipulate polynomial, exponential and logarithmic functions.
   1. Graph and evaluate exponential and logarithmic functions.
   2. Solve exponential equations.

B. Find standard types of limits for rational, exponential and logarithmic functions.
   1. List the properties of limits and continuity.
   2. Determine points of discontinuity or intervals of continuity for functions.
   3. Evaluate limits (of all kinds) using
      a. Graphs
      b. Properties of limits
      c. Algebra
   4. Determine and graph asymptotes
      a. Horizontal
      b. Vertical

C. Find derivatives of polynomial, rational, exponential and logarithmic functions.
   1. Compute average rate of change or the slope of a secant line.
   2. Compute instantaneous rate of change or the slope of a tangent line.
   3. Find an equation of the line tangent to a function at a point.
   4. Find the derivative of a function using the definition.

a. Low degree polynomial
b. Very simple fraction
c. Very simple square root
5. Use the definition of the derivative to prove basic differentiation formulae.
6. Discuss instantaneous rate of change and acceleration in terms of the derivative.
7. Determine points or intervals where functions are not differentiable.
8. Determine the derivative functions of constants, power forms and sums.

D. Use the product, quotient and chain rule to find derivatives of functions.
1. Determine derivatives of products and quotients of functions.
2. Determine derivatives of powers of functions using the general power rule.
3. Determine derivatives combining rules.
4. Find derivatives of logarithmic and exponential functions.
5. State the general derivative rules
a. Power
b. Chain rule
c. Logarithmic and exponential
6. Find derivatives of functions or relations by implicit differentiation.

E. Use derivative rules to find maximums or minimums in applications.
1. Determine higher order derivatives for explicitly defined functions.
2. Use the differential of a function.
3. Determine intervals over which functions are increasing or decreasing.
4. Locate critical values of x.
5. Find local extrema.
6. State and use the first derivative test for local extrema.
7. Describe concavity and inflection points.
8. Determine intervals of concavity.
9. Use the second derivative to determine
a. Concavity
b. Inflection points
c. Local extrema
10. Solve application problems
a. Related rates
b. Compound Interest
c. Continuous compound interest
d. Population growth
e. Marginal analysis

F. Use limits and derivatives to sketch rational, exponential and logarithmic functions.
1. Demonstrate sound graphing strategy.
2. Determine absolute maximum and minimum for functions.

G. Find antiderivatives using properties of indefinite integrals and indefinite integral formulae.
1. Algebraic functions
2. Exponential and logarithmic functions
3. Find definite and indefinite integrals by
a. Direct
b. Substitution
c. Parts
4. Evaluate definite integrals using
a. The Fundamental Theorem
b. Definite integral properties.
5. Find area under a curve by evaluating a definite integral.
6. Evaluate improper integrals by substitution or parts.
7. Find area between curves by evaluating a definite integral.
8. Proximate the value of definite integrals using summations and rectangles.

H. Apply integrals in applications.
1. Differential equations

2. Continuous compound interest
3. Exponential growth
4. Population growth

I. Apply calculus in applications involving probability distributions.
1. Solve basic finite probability models.
2. Verify and use probability density functions.
3. From a given situation, find
    a. the expected value (mean) of X.
    b. the standard deviation of X.
    c. and evaluate probabilities using standard normal distributions.

J. Maximize, minimize and find volumes in three dimensions.
1. Evaluate functions of several variables for numerical and variable replacements.
2. Find partial derivatives of first and second order.
3. Find local extrema using the second partials test.
4. Apply calculus of several variables to find Lagrange multipliers or least squares linear approximations.
5. Evaluate double integrals over rectangular regions.
6. Evaluate average value or volume under a surface.

LABORATORY CONTENT:

METHODS OF INSTRUCTION:

A. Lecture:
B. Independent Study:

INSTRUCTIONAL TECHNIQUES:

Lecture, discussion, and written homework.

COURSE ASSIGNMENTS:

Reading Assignments

As assigned from textbook. 1 hour

Out-of-class Assignments

Assigned problem-solving exercises. 6 hours

Writing Assignments

Writing is encouraged throughout the course but is not necessarily a part of the grading or exams.1 hour

METHODS OF STUDENT EVALUATION:

Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Problem Solving Exercises

Demonstration of Critical Thinking:

Several written exams and a comprehensive final.

Required Writing, Problem Solving, Skills Demonstration:

Writing is encouraged throughout the course but is not necessarily a part of the grading or exams.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

1. Bittinger, Marvin L, Ellenbogen, David J . *Calculus and Its Applications*, 10TH ed. Boston: Pearson Publishing, 2011

Other:

1. Other appropriate textbook as chosen by faculty.

LIBRARY:

Adequate library resources include: Print Materials
Non-Print Materials
Online Materials
Services

Comments:

Attachments:

Attached Files