COURSE OUTLINE OF RECORD

Number: MATH G140  TITLE: Business Calculus

ORIGINATOR: Pete Bouzar  EFF TERM: Fall 2014
FORMERLY KNOWN AS:  DATE OF
OUTLINE/REVIEW: 10-15-2014

CROSS LISTED COURSE:  TOP NO: 1701.00

SEMESTER UNITS: 4.0  CID: MATH 140
HRS LEC: 72.0  HRS LAB: 0.0  HRS OTHER: 0.0
CONTACT HRS TOTAL: 72.0
STUDY NON-CONTACT HRS RECOMMENDED: 144.0

CATALOG DESCRIPTION:
This course is designed for students of business, management, and social science who need only one semester of calculus that covers a variety of topics that usually span parts of three semesters of calculus. Topics include functions, limits and continuity, differentiation, integration, graphing, the calculus of two variables and applications of the derivative and integral. This course does not prepare a student to enter MATH G180 or G185. UC credit limitations: MATH G140 and MATH G180 combined – maximum credit, 1 course.

JUSTIFICATION FOR COURSE:
minor revision to SLOs, content, and objectives for C-ID alignment

PREREQUISITES:
- GWC Math Placement Level of 60 or higher.
- MATH G115: College Algebra with a minimum grade of C or better
- MATH G170: Precalculus with a minimum grade of C or better
- OCC Math Placement Level of 50 or higher.
- MATH A130: College Algebra with a minimum grade of C or better
- MATH A170: Precalculus with a minimum grade of C or better
- CCC Math Placement Level of 70 or higher.
- MATH C115: College Algebra with a minimum grade of C or better
- MATH C170: 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 [ ] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]
COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. use implicit differentiation and related rates concepts to solve business and economics applications.
2. calculate the elasticity of demand and interpret its implications for price manipulation.
3. use the concepts of differentiation and marginality to optimize cost, revenue, and profit functions.
4. use the concepts of integration and supply and demand curves to calculate producer’s and consumer’s surplus.
5. use partial derivatives for optimization of multivariable functions in business and economics including but not limited to optimizing cost, revenue, and profit functions with or without constraints.

COURSE OBJECTIVES:

1. Compute limits of basic functions and the limit of their sums, differences, products, and quotients using the properties of limits.
2. Find the derivatives of functions involving constants, sums, differences, products, quotients, and the chain rule.
3. Find the derivative of polynomial, rational, exponential, and logarithmic functions.
4. sketch the graph of functions using horizontal and vertical asymptotes, intercepts, and first and second derivatives to determine intervals where the function is increasing, decreasing, maximum and minimum values, intervals of concavity and points of inflection.
5. Analyze the marginal cost, revenue, and profit when given an appropriate function.
6. Determine the maxima and minima in optimization problems using derivatives.
7. Compute the first and second partial derivatives of functions of two variables.
8. Apply the calculus of functions of two variables to solve real world problems.
9. Use derivatives to find rates of change and tangent lines.
10. Find definite and indefinite integrals by using the general integral formulas, integration by substitution, and other integration techniques.
11. Use integration in business and economics applications.

COURSE CONTENT:
LECTURE CONTENT:

A. Functions
   1. Real Number, Inequalities, and Lines
   2. Exponents
   3. Functions
   4. Functions Continued
B. Derivatives and Their Uses
   1. Limits and Continuity
   2. Rates of Change, Slopes, and Derivatives
   3. Some Differentiation Formulas
   4. The Product and Quotient Rules
   5. Higher-Order Derivatives
   6. The Chain Rule and the Generalized Power Rule
   7. Nondifferentiable Functions
C. Further Applications of Derivatives
   1. Graphing Using the First Derivative
   2. Graphing Using the First and Second Derivatives
   3. Optimization
   4. Further Applications of Optimization in Business and Economics
   5. Optimizing Lot Size and Harvest Size
   6. Implicit Differentiation and Related Rates
D. Exponential and Logarithmic Functions
   1. Exponential Functions
   2. Logarithmic Functions
   3. Differentiation of Logarithmic and Exponential Functions
   4. Two Applications to Economics: Relative Rates and Elasticity of Demand
E. Integration and Its Applications
   1. Antiderivatives and Indefinite Integrals
   2. Approximating definite integrals as a sum
   3. Integration Using Logarithmic and Exponential Functions
   4. Definite Integrals and Areas
   5. Further Applications of Definite Integrals: Average Value and Area Between Curves
   6. Applications to Business and Economics: Consumers' and Producers' Surplus, Continuous money flow.
   7. Integration by Substitution
F. Integration Techniques and Differential Equations
   1. Integration by Parts
G. Calculus of Several Variables
   1. Functions of Several Variables
   2. Partial Derivatives
   3. Optimizing Functions of Several Variables
   4. Least Squares
   5. Lagrange Multipliers and Constrained Optimization

METHODS OF INSTRUCTION:

A. Lecture:
B. Independent Study:

INSTRUCTIONAL TECHNIQUES:

COURSE ASSIGNMENTS:
   Reading Assignments
   Course textbook which provides explanations, worked examples, and problems to be solved.
   Out-of-class Assignments
Writing Assignments

Homework, quizzes, and examinations covering topics presented in the course.

METHODS OF STUDENT EVALUATION:
Midterm Exam
Final Exam
Short Quizzes
Written Assignments
Essay Examinations
Objective Examinations
Report
Projects (ind/group)
Problem Solving Exercises
Oral Presentations
Skills Demonstration

Demonstration of Critical Thinking:

Analysis and applications of mathematical techniques presented in the course; mathematical modeling and computational methods.

Required Writing, Problem Solving, Skills Demonstration:

Homework, quizzes, and examinations covering topics presented in the course.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

LIBRARY:

Adequate library resources include:

Comments:

Attachments:

Attached Files