Northern Marianas College
CURRICULUM ACTION REQUEST

Effective Semester / Session: Spring 2015

Type of Action:

- X — New
- — Modification
- — Move to Inactive (Stop Out)
- — Cancellation

Course Alpha and Number: MG 305

Course Title: Business Calculus

Reason for initiating, revising, or canceling:
This course is designed to introduce business students to the topics in Business Calculus. Business Calculus is a specialized course in which students will become familiar with the properties of functions, the algebra of functions, and the graphing of functions. Students will also learn the main principles and theorems of Business Calculus using a practical approach. This strategy will help students to perceive the subject as one that can be applied instead of being abstract.

Chavel Green

Proposer   Date

10/24/14

Chavel Green

Department Chair   Date

10/24/14

Barbara K. Merfalen

Dean of Academic Programs and Services   Date

11.5.14

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Course: MG 305 Business Calculus

1. **Department**
   Business

2. **Purpose**
   This course is designed as a semester course for students majoring in Business and Management.

3. **Description**

   A. **Required/Recommended Textbook(s) and Related Materials**
   Required:
   Applied Calculus for the Managerial, Life, and Social Sciences:
   A Brief Approach, 10th Edition; Soo T. Tan. Cengage Learning.

   Brief Edition of Calculus for Business, Economics, and the
   Social and Life Sciences, 11th Edition by Hoffman and Bradley.

   Readability Level: College Level

   B. **Contact Hours**
   1. **Lecture:**   3 hours per week / 45 hours per semester
   2. **Lab:** None
   3. **Other:** None

   C. **Credits**
   1. **Number:** 3
   2. **Type:** Regular degree units

   D. **Catalogue Course Description**
   This course emphasizes basic calculus in Business Applications. Topics include review of functions, graphs, and their algebra; derivatives and their applications; techniques of differentiation; the calculus for the exponential and logarithmic functions with applications to business; and the trigonometric functions and their calculus, differential equations, and applications. Solving word problems are discussed throughout the course. Prerequisite: must complete 60 credit hours to maintain junior level. English Placement Level: EN 202. Math Placement Level: MA 161. (Offered: Spring)

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E. Degree or Certificate Requirements Met by Course
A "C" grade or better in this course satisfies a core course requirement in Northern Marianas College Bachelor of Science in Business Management.

F. Course Activities and Design
Course activities include lectures, discussions, homework-assignments, tests, quizzes, and a final exam.

4. Course Prerequisite(s); Concurrent Course Enrollment; Required English/Mathematics Placement Level(s)
Prerequisites: Must complete 60 credit hours to maintain junior level.
English Placement Level: EN 202
Math Placement Level: MA 161

5. Estimated Cost of Course; Instructional Resources Needed
Cost to the Student: Tuition for a 3-credit course; the cost of the textbook and graphing calculator.

Cost to the College: Instructor's salary.

Instructional resources needed for this course include overhead projector, TV/VCR, videotaped programs, library books, photocopy machine, photocopy paper, dry-erase board.

6. Method of Evaluation
Student's grades will be based on the regular letter grade system as described below:

A: Excellent-grade points:	4.0;
B: Above average-grade points:	3.0;
C: Average-grade points:	2.0;
D: Below average-grade points:	1.0;
F: Failure-grade points:	0.0.

NMC's grading and attendance policies will be followed.

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7. **Course Outline**
This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

1.0   Function
    1.1 Linear
    1.2 Quadratic
    1.3 Intersection of graphs

2.0   Limits, Continuity, and Rate of Change
    2.1 Limits
    2.2 Continuity
    2.3 Average and instantaneous rates of change

3.0   Derivative
    3.1 Rules of differentiation
    3.2 Techniques of differentiation
    3.3 Marginal analysis in business and economics
    3.4 Chain rule
    3.5 Related Rates
    3.6 Implicit differentiation

4.0   Applications of Derivatives
    4.1 Increasing and decreasing functions
    4.2 Extreme values of functions
    4.3 Techniques for curve sketching

5.0   Exponential and Logarithmic Function
    5.1 Derivatives of exponential and Logarithmic functions

6.0   Anti-differentiation
    6.1 Integration by substitution
    6.2 Integration by parts
    6.3 Differential equations

7.0   Definite Integral
    7.1 Area under the curve
    7.2 Riemann integrals

8.0   Functions of Several Variables
    8.1 Function of several variables
    8.2 Partial derivatives
    8.3 Lagrange multiplier

9.0 Trigonometric Function
    6.1 Trigonometric function
    6.2 Derivative of trigonometric function
    6.3 Integration of trigonometric function

8. Instructional Goals
This course will introduce students to:

1.0   Compute derivative and anti-differentiation;

2.0   Interpret and sketch graphs for business or economic purposes;

3.0   Compute definite integral; and

4.0   Do a financial analysis projection of a business or company by using exponential or logarithmic function graphs.

9. Student Learning Outcomes
Upon successful completion of this course, students will be able to:

1.0   Evaluate limits of functions from their graphs and/or equations;

2.0   Analyze and apply the notions of continuity and differentiability to algebraic functions;

3.0   Determine derivatives for functions involving powers, exponentials, logarithms and combinations of these functions and solve business and economic applications using these derivatives;

4.0   Use derivatives to construct graphs of selected functions;

5.0   Use basic integration techniques to solve simple differential equations;

6.0   Demonstrate the connection between area and the definite integral;

7.0   Integrate selected functions and solve business and economic applications using these results;

8.0   Apply the Fundamental Theorem of Calculus to evaluate definite integrals;

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    9.0   Apply the concepts of limits, derivatives and integrals to solve problems involving functions unique to business applications and interpret the results; and

    10.0   Evaluate multivariable functions, determine the first-order and second-order partial derivatives, and use the second derivative test to find the local extrema for multivariable functions.

10. Assessment Measures

Assessment of student learning may include, but not be limited to, the following:

    1.0   Tests and Quizzes;

    2.0   Group projects; and

    3.0   Class participation.