

Northern Marianas College

CURRICULUM ACTION REQUEST

Effective Semester / Session: Fall 2020

Type of Action:

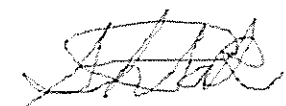

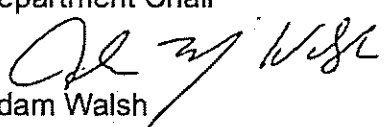
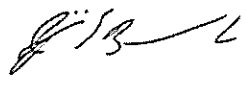

- New
- Modification
- Move to Inactive (Stop Out)
- Cancellation

Course Alpha and Number: MA203

Course Title: Basic Calculus

Reason for initiating, revising, or canceling:

This course is being modified to change in credit hours, assessment measures, student learning outcomes, prerequisite, and the textbook.

| | |
|---|------------|
| "Sean" Seung Ho Pak  | 1.14.21 |
| Proposer  | Date |
| Velma C. De Leon Guerrero | 1/14/2021 |
| Department Chair  | Date |
| Adam Walsh | 01.14.21 |
| Language & Format Review Specialist  | Date |
| Ajani Burrell | 1.14.21 |
| Academic Council Chair  | Date |
| Charlotte Cepeda | 01/15/2021 |
| Dean of Learning & Student Success | Date |

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Course: MA203 Basic Calculus

F. Course Activities and Design

Course activities include: lecture, discussions, homework assignments, tests, quizzes, and a comprehensive final exam.

4. Course Prerequisite(s); Concurrent Course Enrollment

Prerequisites: MA162 (College Trigonometry) score of "C" or better
Concurrent Course Enrollment: N/A

Required English/Mathematics Proficiency Level(s):

English Placement Level: EN095
Mathematics Placement Level: MA132

5. Estimated Cost of Course; Instructional Resources Needed

Cost to the Student: Tuition for a 4-credit course; cost of textbook; cost of a TI-82, TI-83, or TI-89 graphing calculator with manual, and instructor's edition textbook with supplemental materials.

Cost to NMC: Instructor's salary; a classroom.

Instructional resources needed for this course include: whiteboard, markers, and eraser; an electronic projection device, television, or other viewing device for calculator demonstrations; a TI-82, TI-83, or TI-89 graphing calculator with manual and instructor's edition textbook with supplemental materials.

6. Method of Evaluation

Evaluation methods will include quizzes, tests, homework assignments, and a comprehensive final exam. NMC's grading and attendance policies will be followed.

7. Course Outline

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

1.0 Functions and Models

- 1.1 Polynomial functions
- 1.2 Rational functions
- 1.3 Exponential functions
- 1.4 Logarithmic functions
- 1.5 Trigonometric functions
- 1.6 Graphs and their inverses

2.0 Limits and Derivatives

- 2.1 Tangent and velocity
- 2.2 Limits and functions
- 2.3 Continuity
- 2.4 Derivatives and rates of change

3.0. Differentiation Rules

- 3.1 Derivatives of polynomials and exponential functions
- 3.2 Derivatives of trigonometric and logarithmic functions
- 3.3 Product, quotient, and chain rules
- 3.4 Inverse trigonometric functions
- 3.5 Rate of change in the natural and social sciences
- 3.6 Linear approximations and differentials

4.0 Applications of Differentiation

- 4.1 Maximum and minimum values
- 4.2 Derivatives and the shapes of curves
- 4.3 Indeterminate forms
- 4.4 L'Hôpital's rule and Newton's method

5.0 Integrals

- 5.1 Areas and distances
- 5.2 Definite integrals
- 5.3 Fundamental theorem of calculus
- 5.4 Substitution rule
- 5.5 Integration by parts
- 5.6 Additional techniques of integration
- 5.7 Improper integrals

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- 6.0 Applications of Integration
 - 6.1 Volumes by cylindrical shells
 - 6.2 Arc length
 - 6.3 Average value of a function
 - 6.4 Applications to physics, engineering, economics, and biology

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8. Instructional Goals

The course will introduce students to:

- 1.0 Function and Models;
- 2.0 Limits and Derivatives;
- 3.0 Differentiation Rules;
- 4.0 Applications of Differentiation;
- 5.0 Integrals; and
- 6.0 Applications of Integration.

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9. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1.0 Demonstrate the basic ideas concerning functions, graphs, and the ways of transforming and combining them;
- 2.0 Find limits graphically, numerically, analytically, and derivatively of functions using the limit definition;
- 3.0 Find derivatives' maximum and minimums using various differentiation rules;
- 4.0 Solve applications of differentiations;
- 5.0 Analyze the connection between integral calculus and differential calculus; and
- 6.0 Solve applications of the definite integral to compute measurements in curves, solids, gravity, and force, as well as quantities of interest in biology, economics, and statistics.

10. Assessment Measures of Student Learning Outcomes

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

- 1.0 Quizzes;
- 2.0 Chapter Tests;
- 3.0 Homework Assignments; and
- 4.0 Final Comprehensive Examination

