BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

MATH 31A - Calculus with MAPLE **1 Unit(s)**

Prerequisite(s): MATH 30
Co-requisite(s): MATH 31
Recommended Prep: Reading Level IV
Transfer Status: CSU/UC
9 hours Lecture
18 hours Lab

This course introduces a student to the MAPLE Symbolic Math Package. This computer program will be used in a variety of situations, including problem solving, calculus investigations, and "real life" calculus problems. Mathematical concepts from Math 30 and Math 31 will be used.

II. **OBJECTIVES**

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

A. Understand MAPLE input and output as it relates to expressions, functions, equations, and calculus concepts.
B. Use MAPLE to solve applied calculus problems.
C. Use discovery learning to reinforce ideas presented in second semester calculus.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics	Hours
1. Introduction to Computer Configuration	0.50
2. Introduction to MAPLE	0.50
3. MAPLE Expressions - Equations with expressions, differentiation of expressions, integration of expressions, and reading output using expressions	4.00
4. MAPLE Functions - Equations with functions, derivatives of functions, integration of functions, and reading function output	4.00
Total Hours	9.00

Lab

Topics	Hours
1. Introduction to expressions, input and output	1.00
2. Equations with expressions and applications	1.00
3. Derivatives, integrals, and applications	2.00
4. Series and sequences	2.00
5. Taylor series with MAPLE	1.00
6. Using MAPLE "Help" to learn both mathematics and MAPLE commands	1.00
7. Functions with MAPLE	1.00
8. Applications using Math 31 topics	2.00
9. Parametric equations with MAPLE	1.00

10. Polar equations with MAPLE	1.00
11. Conic sections	1.00
12. Major project Math 31 topic using MAPLE	4.00
Total Hours	18.00

IV. **METHODS OF INSTRUCTION**

A. Lecture
B. Collaborative Group Work
C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
D. Discussion
E. Hands-on activities

V. **METHODS OF EVALUATION**

A. Quizzes
B. Projects
C. Written Examinations
D. Class Assignments and Class Response

VI. **EXAMPLES OF ASSIGNMENTS**

A. Reading Assignments
   1. Read section in the textbook on functions and be able to write the code for various functions.
   2. Read the section in the textbook on parametric equations and be able to write several parametric equations in MAPLE code and graph.

B. Writing Assignments
   1. Describe in words the difference between a MAPLE function and expression and explain when you would use an expression or a function.
   2. Describe in words the process of changing a polar equation into a parametric equation.

C. Out-of-Class Assignments
   1. Review the section in the textbook on functions and complete the two assignments on this topic.
   2. Review the section on step-functions in your textbook and complete the assigned problems on this topic.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Materials Other Than Textbooks:

A. Workbook on MAPLE developed by Richard Campbell in 2005.

Created/Revised by: Laurie Kincheloe
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