BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

MATH 31 - Analytic Geometry and Calculus II **4 Unit(s)**

Prerequisite(s): MATH 30
Recommended Prep: Reading Level IV
Transfer Status: CSU/UC
68 hours Lecture

A second course in differential and integral calculus of a single variable: integration; techniques of integration, infinite sequences and series, polar and parametric equations, applications of integration. Primarily for Science, Technology, Engineering & Math Majors. For students who have no knowledge of or access to a symbolic math program (such as MAPLE, Mathematica, Derive, or the TI-89,) the mathematics department offers instruction in MAPLE (MATH 31A), which may be taken concurrently with MATH 31. (C-ID MATH 220).

II. **OBJECTIVES**

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

A. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques.
B. Apply integration to areas, volumes, and other applications such as work, force, centers of mass, or length of a curve.
C. Evaluate improper integrals.
D. Apply convergence tests to sequences and series.
E. Represent functions as power series.
F. Graph, differentiate, and integrate functions in polar and parametric form.

III. **COURSE CONTENT**

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

Lecture

Topics	Hours
1. Areas between curves	2.00
2. Volume and volume of solid of revolution	3.00
3. Additional techniques of integration including integration by parts and trigonometric substitution	14.00
4. Numerical integration: trapezoidal and Simpson's rule	1.00
5. Improper integrals	3.00
6. Applications of integration to areas and volumes	2.00
7. Additional applications such as work, arc length, area of a surface of revolution, moments and centers of mass, separable differential equations, growth and decay	10.00
8. Introduction to sequences and series	2.00
9. Multiple tests for convergence of sequences and series	10.00
10. Power series, radius of convergence, interval of convergence	4.00
11. Differentiation and integration of power series	3.00
12. Taylor series expansion of functions	4.00
13. Parametric equations and calculus with parametric curves	5.00

14. Polar curves and calculus in polar coordinates	5.00
Total Hours	68.00

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. Board Work

V. METHODS OF EVALUATION

A. Exams/Tests
B. Quizzes
C. Class Assignments and Class Response
D. Daily Homework Assignments, where the student will demonstrate problem-solving skills

VI. EXAMPLES OF ASSIGNMENTS

A. Reading Assignments
   1. Read section in the textbook on solids of revolution and be able to determine when the disk method or shell method is the appropriate method to use.
   2. Read the section in the textbook on improper integrals and be able to distinguish between the two basic types.

B. Writing Assignments
   1. Assume you are explaining the steps to a fellow student who is having trouble and describe the process of finding a Taylor polynomial degree four about x = 1 for f(x)=ln(x).
   2. Write down the process you would go through to solve the improper integral of 1/(x+1) with a lower limit of -1 and an upper limit of 2.

C. Out-of-Class Assignments
   1. Review the section in the textbook on partial fractions and solve the problems assigned by the instructor showing all steps.
   2. Review the section in the textbook on Work Problems and solve the problems assigned by the instructor showing all work.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. Larson, R. & Edwards, B.H. Calculus of a Single Variable. 9th Edition. Brooks/Cole Cengage Learning, 2010.

Materials Other Than Textbooks:

A. Graphing calculator

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Date: 04/01/2013