ORIGINATION DATE:	08/02/99	**APPROVAL DATE:**	03/01/00	
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COURSE ID: **MATH2450**
COURSE TITLE: Applied Calculus II

	LECTURE	LAB	CLINICAL	TOTAL	OBR MIN	OBR MAX
CREDITS:	3.00	0.00	0.00	3.00	3.00	3.00
CONTACT HOURS:	3.00	0.00	0.00	3.00		

PREREQUISITE:

MATH2350

COURSE DESCRIPTION:

This course explores integral calculus as applied to business, social sciences, and life sciences. Topics include definite and indefinite integrals, improper integrals, differential equations, multivariable calculus, applications of the integral, consumers' and producers' surplus, integration of rate functions, growth models, and Cobb-Douglas production functions. Students must supply a graphing calculator.

RATIONALE FOR COURSE:

A continuation of Math 2350, integral calculus and its concepts are applied to the business, life, and social sciences. This course is required for many baccalaureate programs in business, management, accounting, economics, and finance programs.

GENERAL COURSE GOALS:
The course will

1. Further develop students' ability to use the language of mathematics in speaking and in writing.

2. Introduce, develop and apply integral calculus techniques and to demonstrate how those techniques are used in real-life applications.

3. Further develop the use of technology (via computer and/or graphing calculators) as a tool for determining solutions to real-life dynamic applications.

4. Further develop students' abilities to solve application problems using the anti-derivative and to analyze and interpret the solutions to the problems analytically, numerically, graphically, and verbally.

5. Engage students in the exploration of the key concepts of integral calculus through laboratory assignments, individually, and in groups.

6. Strengthen students' abilities to critically apply mathematical concepts to develop and test hypotheses, solve problems, and determine the reasonableness of results.

COURSE OBJECTIVES:
Upon completion of the course, the student should be able to

1. Compute anti-derivatives.

2. Apply the Fundamental Theorem of Calculus (FTC) to compute definite integrals.

3. Apply the technique of u-substitution to compute indefinite and definite integrals.

4. Apply the integration by parts technique to compute indefinite and definite integrals.

5. Compute the area under a curve and the area between a curve via the definite integral.

6. Compute improper integrals and their applications.

7. Apply integration techniques to business applications including total money flow, present and future value problems, capital value, consumer, and producers' surplus.

8. Use numerical integration techniques in applications.

9. Graph and evaluate a function at several variables.

10. Compute partial derivatives of multivariable functions.

11. Determine maxima and minima of multi-variable functions using techniques such as the D-test and Lagrange multipliers.

12. Solve ordinary differential equations via separation of variables.

13. Use differential equations to develop unlimited and limited growth and decay models.

14. Develop analytic as well as graphical and numeric techniques using technology for solving problems.

15. Apply appropriate technology to develop and test hypotheses, solve mathematical problems, interpret results, and judge the reasonableness of results.

COURSE OUTLINE:

I.   Introduction to Integration
    A.   The anti-derivative
    B.   The indefinite integral
    C.   The Fundamental Theorem of Calculus

II. Integration Techniques
    A.   U-substitution
    B.   Integration by parts
    C.   Numerical integration techniques

III. Applications of the Definite Integral
    A.   The average value of a function
    B.   Integration of rate functions to obtain a continuous accumulation
    C.   Financial Applications
        1.   Total money flow
        2.   Continuous present and future value
        3.   Capital Value

           4.   Lorenz Curves and the Gini Index

IV.   Introduction to Differential Equations
    A.   Solution to differential equations
    B.   Solving differential equations via separation of variables
    C.   Solving linear first order differential equations
    D.   Applications of differential equations
        1.   Unlimited growth models
        2.   Limited growth and decay models

V.   Multivariable Calculus
    A.   Evaluating multivariable functions
    B.   Cross-Sectional analysis and level curves
    C.   Computing first and second order partial derivatives
    D.   Determining Maxima and Minima of multivariable functions
    E.   The Method of Lagrange Multipliers
    F.   Computing double integrals

INSTRUCTIONAL PROCEDURES THAT MAY BE UTILIZED:

Lecture and discussion
Computer and/or graphing calculator based activities
Group and/or individual activities
Research projects utilizing real data gathered from the internet or other sources

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GRADING PROCEDURES:

It is recommended that the instructors have at least five evaluative items on which to determine the student's course grade. In general, tests are given covering lecture and homework assignments.

COURSE EVALUATION PROCEDURES:

Student Evaluations
Department Review

LAKELAND LEARNING OUTCOMES

	LEARNS ACTIVELY	Methods of Assessment								
		1	2	3	4	5	6	7	8	9
1.	Takes responsibility for his/her own learning									
2.	Uses effective learning strategies									
3.	Reflects on effectiveness of his/her own learning strategies									

	THINKS CRITICALLY	1	2	3	4	5	6	7	8	9
4.	Identifies an issue or idea									
5.	Explores perspectives relevant to an issue or idea									
6a.	Identifies options or positions									
6b.	Critiques options or positions									
7.	Selects an option or position	1	2							
8a.	Implements a selected option or position									
8b.	Reflects on a selected option or position									

	COMMUNICATES CLEARLY	1	2	3	4	5	6	7	8	9
9a.	Uses correct spoken English									
9b.	Uses correct written English									
10.	Conveys a clear purpose									
11.	Presents ideas logically									
12a.	Comprehends the appropriate form(s) of expression									
12b.	Uses the appropriate form(s) of expression									
13.	Engages in an exchange of ideas									

	USES INFORMATION EFFECTIVELY	1	2	3	4	5	6	7	8	9
14.	Develops an effective search strategy									
15a.	Uses technology to access information	1	2							
15b.	Uses technology to manage information	1	2							
16.	Uses selection criteria to choose appropriate information									
17.	Uses information responsibly									

	INTERACTS IN DIVERSE ENVIRONMENTS	1	2	3	4	5	6	7	8	9
18a.	Demonstrates knowledge of diverse ideas									
18b.	Demonstrates knowledge of diverse values									
19.	Describes ways in which issues are embedded in relevant contexts									
20a.	Collaborates with others									
20b.	Collaborates with others in a variety of situations									
21.	Acts with respect for others									

Methods of Assessment Codes:		
1. Test/Examination	4. Collaborative Writing	7. Portfolio
2. Homework/Written Assignment	5. Presentation	8. Demonstration of Skills
3. Research Project	6. Lab Project	9. Other (Specify in Grading Procedures)