MATH 142 Calculus II

1. Catalog Description

MATH 142 Calculus II **4 units**
GE Area B1

Prerequisite: MATH 141 with a grade of C- or better or consent of instructor.

Techniques of integration, applications to physics, transcendental functions. 4 lectures. Crosslisted as HNRS/MATH 142. Fulfills GE B1; for students admitted Fall 2016 or later, a grade of C- or better in one GE B1 course is required to fulfill GE Area B.

2. Required Background or Experience

Math 141 or equivalent.

3. Learning Objectives

The student should:

a. Be able to differentiate and integrate elementary transcendental functions.
b. Understand some of the applications of integration, including areas, volumes, work, arc length, lateral surface area, and center of mass.
c. Know how to integrate combinations of elementary functions with accuracy and confidence.

4. Text and References

- Stewart, Calculus, 8th edition, Cengage

5. Minimum Student Materials

Paper, pencils and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.

7. Content and Method

Content	No. of Lectures
CHAPTER 4 – **INTEGRALS**	1
4.5 The Substitution Rule	
CHAPTER 5 – **APPLICATIONS OF INTEGRATION**	5
5.1 Areas Between Curves	
5.2 Volumes	
5.3 Volumes by Cylindrical Shells	
5.4 Work	
CHAPTER 6 – **INVERSE FUNCTIONS: EXPONENTIAL, LOGARITHMIC AND INVERSE TRIGONOMETRIC FUNCTIONS**	8
6.1 Inverse Functions	
6.2 Exponential Functions and Their Derivatives	
6.3 Logarithmic Functions	
6.4 Derivatives of Logarithmic Functions	
6.5 Exponential Growth and Decay (may be postponed until after 9.3)	
6.6 Inverse Trigonometric Functions (emphasize inverse sine and tangent functions)	
6.8 Indeterminate Forms and l'Hôspital's Rule	
CHAPTER 7 – **TECHNIQUES OF INTEGRATION**	9
7.1 Integration by Parts	
7.2 Trigonometric Integrals	
7.3 Trigonometric Substitution	
7.4 Integration of Rational Functions by Partial Fractions	
7.5 Strategy for Integration	
7.7 Approximate Integration	
7.8 Improper Integrals	
CHAPTER 8 – **FURTHER APPLICATIONS OF INTEGRATION**	5
8.1 Arc Length	
8.2 Area of a Surface of Revolution	
8.3 Applications to Physics and Engineering	
CHAPTER 9 – **DIFFERENTIAL EQUATIONS**	2
9.3 Separable Equations	
9.4 Models for Population Growth	
Total	30

8. Methods of Assessment

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination.