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

- Weir and Hass, Thomas' Calculus, Addison-Wesley

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 5 – **INTEGRATION**	2
5.5 Indefinite Integrals and the Substitution Method	
5.6 Substitution and Area Between Curves	
CHAPTER 6 – **APPLICATIONS OF DEFINITE INTEGRALS**	9
6.1 Volumes Using Cross-Sections	
6.2 Volumes Using Cylindrical Shells	
6.3 Arc Length	
6.4 Areas of Surfaces of Revolution	
6.5 Work and Fluid Forces	
6.6 Moments and Centers of Mass (the subsections on fluid forces and the Theorems of Pappus may be skipped)	
CHAPTER 7 – **TRANSCENDENTAL FUNCTIONS**	9
7.1 Inverse Functions and Their Derivatives	
7.2 Natural Logarithms	
7.3 Exponential Functions	
7.4 Exponential Change and Separable Differential Equations	
7.5 Indeterminate Forms and L'Hôpital's Rule	
7.6 Inverse Trigonometric Functions (emphasize inverse sine and tangent functions)	
CHAPTER 8 – **TECHNIQUES OF INTEGRATION**	9
8.1 Integration by Parts	
8.2 Trigonometric Integrals	
8.3 Trigonometric Substitutions	
8.4 Integration of Rational Functions by Partial Fractions	
8.6 Numerical Integration	
8.7 Improper Integrals	
CHAPTER 9 – **FIRST-ORDER DIFFERENTIAL EQUATIONS**	1
9.4 Graphical Solutions of Autonomous Equations	
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. Students are required to show their work, and are graded not only on the correctness of their answers, but also on their understanding of the concepts and techniques.