COURSE OUTLINE

MATH 162 – CALCULUS II

Prepared By: Jaiyan Lin, Daniel Gagliardi
A. **TITLE:** MATH 162 – CALCULUS II

B. **COURSE NUMBER:** MATH 162

C. **CREDIT HOURS:** 4

D. **WRITING INTENSIVE COURSE:** N/A

E. **COURSE LENGTH:** 15 weeks

F. **SEMESTER(S) OFFERED:** Spring semester

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:** This course will consist of four 50-minute lecture/recitation/computer lab

H. **CATALOG DESCRIPTION:** This course is the second of a three-semester sequence in Calculus. Topics include: differentials, definite integrals and their applications; integration of exponential, logarithmic, trigonometric and inverse trigonometric functions; techniques of integration; series; parametric equations and polar coordinates. Four hours of lecture per week.

I. **PRE-REQUISITES/CO-COURSES:** Calculus I (MATH 161) with a grade of C or better or permission of instructor.

J. **GOALS (STUDENT LEARNING OUTCOMES):** By the end of the course, the student will be able to:

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<th>Course Objective</th>
<th>Institutional SLO</th>
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<tr>
<td>a. Apply results from Calculus I to differentiate and integrate functions and relations and use the integration technique of u-substitution</td>
<td>1) Communication 2) Critical Thinking 3) Professional Competency</td>
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<td>b. Use the definite integral to compute area, volume, arc length, and work done by a variable force</td>
<td>1) Communication 2) Critical Thinking 3) Professional Competency</td>
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<td>c. Solve problems involving exponential and logarithm functions and compute derivatives and integrals of these functions</td>
<td>1) Communication 2) Critical Thinking 3) Professional Competency</td>
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<td>d. Use substitution, integration by parts, trigonometric substitutions, and partial fractions to compute integrals</td>
<td>1) Communication 2) Critical Thinking 3) Professional Competency</td>
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<td>e. Use L'Hopital's rule to compute limits of indeterminate forms at infinity and zero, and find the limit of a sequence</td>
<td>1) Communication 2) Critical Thinking 3) Professional Competency</td>
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<td>f. Produce Taylor series and Maclauran series for a variety of common functions</td>
<td>1) Communication 2) Critical Thinking 3) Professional Competency</td>
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K. **TEXTS:** Members of the Mathematics Department who will be teaching the course will select the appropriate text. Audio-visual aids and computer software will be used when appropriate and available.

L. **REFERENCES:** None

M. **EQUIPMENT:** Smart classroom (Computer projection and access to the Internet)

N. **GRADING METHOD:** A-F
O. **MEASUREMENT CRITERIA/METHODS:**
   - Homework
   - Quizzes
   - Tests
   - Participation

P. **DETAILED COURSE OUTLINE:**

I. Applications of Integration
   A. Area between two curves
   B. Volumes of Revolution
      1. Disk Method
      2. Washer Method
      3. Shell Method
   C. The length of an Arc
   D. Surface Area (Optional)
   E. Work (Liquid Pressure and Moments Optional)

II. Transcendental Functions
   A. Techniques for Integration of Products Powers of Trigonometric Functions
   B. Differentiation and Integration of Logarithmic and Exponential Functions
   C. Logarithmic Differentiation
   D. Differentiation and Integration of Inverse Trigonometric Functions

III. Integration Techniques, L’Hopital’s Rule, and Improper Integrals
   A. Integration by Substitution
   B. Integration by Parts
   C. Trigonometric Integrals
   D. Trigonometric Substitution
   E. Partial Fractions
   F. Limits of Indeterminate Form and L’Hopital’s Rule
   G. Improper Integrals

IV. Infinite Series
   A. Sequences, monotonic sequences and bounded sequences
   B. Geometric Series
   C. Tests for Convergence and Divergence for Series of Constant terms (optional)
   D. Power series
   E. Taylor series and Maclaurin series of common functions

Q. **LABORATORY OUTLINE:** N/A.