A. **TITLE:** CALCULUS II

B. **COURSE NUMBER:** MATH 162

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

   - # Credit Hours: 4
   - # Lecture Hours: 4 per week
   - # Lab Hours: 0 per week
   - Other: per week

   Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes ☑ No ☐

E. **GER CATEGORY:** None: ☐ Yes: GER

   *If course satisfies more than one:* GER

F. **SEMESTER(S) OFFERED:** Fall ☐ Spring ☐ Fall & Spring ☑

G. **COURSE 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.

H. **PRE-REQUISITES:** None ☐ Yes ☑ If yes, list below:

   Calculus I (MATH 161) with a grade of C or better or permission of instructor.

   **CO-REQUISITES:** None ☑ Yes ☐ If yes, list below:
## I. STUDENT LEARNING OUTCOMES: *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply results from Calculus I to differentiate and integrate functions and relations and use the integration technique of u-substitution</td>
<td></td>
<td>GER 1 3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<tr>
<td>Use the definite integral to compute area, volume, arc length, and work done by a variable force</td>
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<td>GER 1 3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<tr>
<td>Solve problems involving exponential and logarithm functions and compute derivatives and integrals of these functions</td>
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<td>GER 1 3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<tr>
<td>Use substitution, integration by parts, trigonometric substitutions, and partial fractions to compute integrals</td>
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<td>GER 1 3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<tr>
<td>Use L’Hopitals rule to compute limits of indeterminate forms at infinity and zero, and find the limit of a sequence</td>
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<td>GER 1 3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<tr>
<td>Produce Taylor series and Maclaurin series for a variety of common functions</td>
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<td>GER 1 3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<td>KEY</td>
<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<td>#</td>
<td>Communication Skills</td>
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<td>Oral [O], Written [W]</td>
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<td>2</td>
<td>Critical Thinking</td>
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<td></td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<td>3</td>
<td>Foundational Skills</td>
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<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<td>4</td>
<td>Social Responsibility</td>
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<td></td>
<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
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<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
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</table>

*Include program objectives if applicable. Please consult with Program Coordinator.*
J. **APPLIED LEARNING COMPONENT:** Yes ☐ No ☒

If YES, select one or more of the following categories:

- Classroom/Lab
- Internship
- Clinical Placement
- Practicum
- Service Learning
- Community Service
- Civic Engagement
- Creative Works/Senior Project
- Research
- Entrepreneurship (program, class, project)

K. **TEXTS:**


L. **REFERENCES:**

Many materials in the Math Lab and online will aid the students with mastery of this subject

M. **EQUIPMENT:** None ☒ Needed:

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Homework
- Quizzes
- Exams
- Projects

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:** None ☒ Yes ☐