**1. COURSE TITLE\*:** Calculus II

**2. CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: MATH 2222**

**3. PREREQUISITE\*:**

* MATH 2221, Math 222, or the equivalent

**COREQUISITE(S)\*: None**

**4. COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**

**5. CREDIT HOURS\*:** 5 **LECTURE HOURS\*:** 5

**LABORATORY HOURS\*:** 0 **OBSERVATION HOURS\*:** 0

**6. FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***

**7. COURSE DESCRIPTION\*:**

This course is a continuation of Math 2221 Calculus I and includes applications of integration such as areas between curves, volumes of rotation, work, arc length, applications to physics and engineering; techniques of integration; parametric equations and polar coordinates; and infinite sequences and series.

**8. LEARNING OUTCOMES\*:**

At the completion of this course the student will be able to:

1. Use antiderivatives to evaluate definite integrals and apply definite integrals in a variety of applications to model physical, biological or economic situations. Whatever applications (e.g. determining area, volume of solids of revolution, arc length, area of surfaces of revolution, centroids, work, and fluid forces) are chosen, the emphasis should be on setting up an approximating Riemann sum and representing its limit as a definite integral. [TMM006 – Outcome 1]
2. Employ a variety of integration techniques to evaluate special types of integrals including substitution, integration by parts, trigonometric substitution, and partial fraction decomposition. [TMM006 – Outcome 3]

 3. Approximate a definite integral by the Trapezoidal Rule and Simpson’s Rule. [TMM006 – Outcome 2]

 4. Evaluate limits that result in indeterminate forms, including the application of L’Hôpital’s Rule. [TMM006 – Outcome 4]

 5. Evaluate improper integrals, including integrals over infinite intervals, as well as integrals in which the integrand becomes infinite on the interval of integration. [TMM006 – Outcome 5]

 6. Determine the existence of, estimate numerically and graphically, and find algebraically the limits of sequences. Determine whether a series converges by using appropriate tests, including the comparison, ratio, root, integral and alternating series tests. [TMM006 – Outcome 7]

 7. Find the *nth* Taylor polynomial at a specified center for a function and estimate the error term. Use appropriate techniques to differentiate, integrate and find the radius of convergence for the power series of various functions. [TMM006 – Outcome 8]

 8. Analyze curves given parametrically and in polar form and find the areas of regions defined by such curves. [TMM006 – Outcome 9]

**9.       ADOPTED TEXT(S)\*:**

           *Calculus*. Third Edition.

 Briggs, Cochran, Gillett, Schulz

Pearson, 2019

ISBN # 978-0-13-476563-1

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

**10. OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***

A scientific calculator is required; a graphing calculator is strongly recommended. Symbolic manipulator calculators (e.g., TI–89 or TI-Nspire) are prohibited on tests.

**11. GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

A: 90 – 100

 B: 80 – 89

 C: 70 – 79

 D: 60 – 69

 F: 0 – 59

**12. GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

|  |
| --- |
| *Example 1 - By Percent* |
|  Homework 10% Quizzes/Tests 90% Total 100% |

|  |
| --- |
| *Example 2*  |
| *Category* | *By Total Points* | *% of Grade* |
| Homework (20x10) | 200 | 10% |
| Quizzes/Tests(5x360) | 1800 | 90% |
| Total | 2000 | 100% |

|  |
| --- |
| *Example 3* |
| *Category* | *By Total Points* | *% of Grade* |
| Online Quizzes | 400 | 100% |
| Online Tests(6x100) | 600 | 15% |
| Notebook(2x500) | 1000 | 25% |
| Midterm | 1000 | 25% |
| Final | 1000 | 25% |
| Total | 4000 | 100% |

**13. COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

The course design provides instruction and materials to support the course objectives.  Classes may consist of a variety of means to accomplish this including but not limiting to: lectures, class discussions, small group projects, supplemental materials, and outside assignments.  Practice is an important part of the learning process.  For every one hour of class time, two additional hours of study time should be expected.

**14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)***

 Note: This outline covers required TMM 006 Outcomes 1, 3, 4, 5, 7,

 8, and 9, plus optional Outcome 2.

 **Chapter 6 Applications of Integration** **(TMM 006 – Outcome 1)**

 6.1 Velocity and Net Change

 6.2 Regions Between Curves

 6.3 Volume by Slicing

 6.4 Volume by Shells

 6.5 Length of Curves

 6.6 Surface Area

 6.7 Physical Applications

 **Chapter 8 Integration Techniques (TMM 006 – Outcomes 2, 3)**

 8.1 Basic Approaches

 8.2 Integration by Parts

 8.3 Trigonometric Integrals

 8.4 Trigonometric Substitutions

 8.5 Partial Fractions

 8.6 Integration Strategies

 8.7 Other Methods of Integration

 8.8 Numerical Integration

 8.9 Improper Integrals

 **Chapter 10 Sequences and Infinite Series (TMM 006 – Outcomes 4, 5, 7)**

 10.1 An Overview

 10.2 Sequences

 10.3 Infinite Series

 10.4 The Divergence and Integral Tests

 10.5 Comparison Tests

 10.6 Alternating Series

 10.7 The Ratio and Root Tests

 10.8 Choosing a Convergence Test

 **Chapter 11 Power Series (TMM 006 – Outcome 8)**

 11.1 Approximating Functions with Polynomials

 11.2 Properties of Power Series

 11.3 Taylor Series

 11.4 Working with Taylor Series

 **Chapter 12: Parametric and Polar Curves** **(TMM 006 – Outcome 9)**

 12.1 Parametric Equations

 12.2 Polar Coordinates

 12.3 Calculus in Polar Coordinates

 12.4 Conic Sections (optional)

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

Suggested pace for the course, by section numbers:

Week 1: 6.1, 6.2, 6.3

Week 2: 6.3, 6.4, 6.5

Week 3: 6.5, 6.6, 6.7

Week 4: 6.7, 8.1, 8.2

Week 5: 8.3, 8.4

Week 6: 8.3, 8.4

Week 7: 8.5, 8.6

Week 8: 8.7, 8.8, 8.9

Week 9: 10.1, 10.2, 10.3

Week 10: 10.4, 10.5, 10.6

Week 11: 10.7, 10.8

Week 12: 11.1, 11.2

Week 13: 11.3, 11.4

Week 14: 12.1, 12.2

Week 15: 12.3

Week 16: **Finals**

**16. FERPA:\***

Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**17. DISABILITIES:\***

Students with disabilities may contact the Disability Services Office, Central Campus, at 800-628-7722 or 937-393-3431.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

\*\*\*Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.