Department: Mathematics

# Course Name: MAT-132 Analytical Geometry and Calculus II

Date Updated: 11/2023

Credit Hours/week: 4 hrs./wk. – 4 cr.

BEGINNING: SPRING 2024

Catalog Description: A continuation of Analytic Geometry and Calculus I, which covers the calculus of inverse trigonometric functions, methods of integration, analytic geometry in the plane including polar coordinates and conic sections, hyperbolic functions, sequences and series, and parametric equations

Prerequisite: MAT 131 (grade of "C" or better) or equivalent.

Text: Larson, Ron, and Bruce H. Edwards. Calculus of a Single Variable: Early Transcendental Functions, 8 th ed. Cengage Learning, 2024

Syllabus:

| Period | Text Sections | Topics |
|---|---|---|
| 1-2 | 1.5, 5.9 | Calculus 1 Review, Hyperbolic Functions |
| 3-4 | 6.2-6.3 | Growth and Decay, Separation of Variables |
| 5 | 7.1 | Area between curves |
| 6-7 | 7.2-7.3 | Disk Method and Cross Sections, Shell Method |
| 8 | 7.4 | Arc Length and Surface Area |
| 9-10 | | Review, **Exam** |
| 11 | 8.1 | Basic Integration Rules |
| 12 | 8.2 | Integration by Parts |
| 13 | 8.3 | Trigonometric Integrals |
| 14 | 8.4 | Trigonometric Substitution |
| 15 | 8.5 | Partial Fractions |
| 16 | 8.6 | Numerical Integration |
| 17 | 8.8 | Improper Integrals |
| 18-19 | | Review, **Midterm Exam** |
| 20-21 | 9.1 | Sequences |
| 22 | 9.2 | Series and Convergence |
| 23 | 9.3 | Integral Test and p-Series |
| 24 | 9.4 | Comparison Tests |
| 25 | 9.5 | Alternation Series |
| 26 | 9.6 | Ratio and Root Tests |
| 27 | 9.7 | Taylor Polynomials |
| 28 | 9.8 | Power Series |
| 29 | 9.9 | Representation of Functions by Power Series |
| 30 | 9.10 | Taylor and Maclaurin Series |
| 31-32 | | Review, **Exam** |
| 33-34 | 10.1 | Conic Sections |
| 35 | 10.2 | Plane Curves and Parametric Equations |
| 36 | 10.3 | Parametric Equations and Calculus |
| 37-38 | 10.4 | Polar Coordinates and Polar Graphs |
| 39-40 | 10.5 | Area and Arc Length in Polar Coordinates |
| 41 | 10.6 | Polar Equations of Conics |
| 42-43 | 7.5-7.7 | (Time Permitting) Work, Centers of Mass, Fluid Pressure and Force |
| 44-45 | | Review, **Final Exam** |

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at: https://www.ccm.edu/academics/academic-policies/

# Statement of Expected Course LEARNING OUTCOMES

- **Choose and apply** appropriate integration techniques
- **Model and solve** problems including areas, volumes, arc lengths, surface areas, and work
- **Determine** whether a series converges or diverges by selecting an appropriate convergence test and applying it
- **Use** power series to represent functions and **create** Maclaurin and Taylor series for familiar transcendental functions
- **Identify and graph** conic sections
- **Sketch** graphs of parametric and polar equations, and **apply** derivatives and integrals in parametric and polar forms to solve problems including arc length and surface area