

# COUNTY COLLEGE OF MORRIS

## Course Information Outline

Course Title Analytic Geometry and Calculus II PREFIX&NUMBER MAT 132

Lecture Hours 60 Laboratory Hours 0 Credit Hours 4 Course Fee None

Department Chairperson Approval J. Monaghan Date \_\_\_\_\_

Division Dean Approval P. Enright  Date 5 - 28 - 10

**1. Catalog Course 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 and inverse hyperbolic functions, sequences and series, and parametric equations.

**2. Prerequisite(s)**

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

**3. Co-requisite(s)**

None

**4. Textbooks**

Larson, Hostetler, Edwards, *Calculus of a Single Variable*, 9th ed. (Brooks/Cole, 2010).

**5. Supplementary Books and/or Materials**

Edwards, Student's Study and Solutions Guide, Vol. 1

**6. Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations.** (Information will be used to determine differential funding category.)

None

**7. Course Content (List of Topics)**

- Brief review of the end of MAT131
- Inverse trigonometric functions; differentiation, integration
- Hyperbolic functions
- Areas between curves; volumes by discs and shells
- Arc length, surfaces of revolution, work and other applications of integration
- Integration rules; integration by parts
- Trigonometric integrals; trigonometric substitutions, partial fractions
- Use of tables, other techniques including  $u = \tan(x/2)$
- L'Hôpital's Rule (done in MAT131), improper integrals
- Sequences, series, tests for convergence

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- Alternating series, ratio and root tests
- Taylor polynomials and approximations
- Power, Taylor and Maclaurin series; Fourier series
- Conic sections, the discriminant, rotation in the plane
- Plane curves, parametric equations
- Polar curves and graphs, area and length in polar equations
- Polar equations

**8. Statement of 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, including rotation of axes
- **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

**9. Statement of Relation to Curriculum(s)**

MAT 132 is a required course in the engineering science, mathematics and math-science programs and is an elective in the biology and business administration programs.

COUNTY COLLEGE OF MORRIS  
COURSE INFORMATION OUTLINE

Course Analytic Geometry and Calculus II Cat. No. MAT 132  
Clinical  
Class Hours 60 Laboratory Hours 0 Credit Hours 4 Course Fee None  
Recitation  
Faculty Course Coordinator None

Department Chairperson Approval J. R. Monaghan Approval Date 8-18-97

Division Dean Approval M. C. Ayres Approval Date 8/31/97

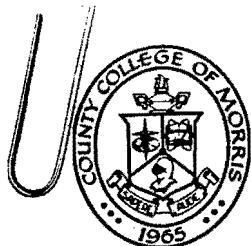
1. Prerequisite (Last Course or Courses) MAT 131
2. Co-requisite None
3. Textbooks: Anton, Calculus with Analytic Geometry, 5th ed. (Wiley), ISBN 0-471-59495-4
4. Supplementary Books : Barker and Ward, The Calculus Companion (Anton), 5th ed. (Wiley), ISBN 0-471-10678-X
5. Supplementary Materials: None
6. Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations. (Information will be used to determine differential funding category.): None
7. Statement Course Objectives: MAT 132 continues the students' instruction in differentiation and integration, using additional functions and more complicated examples and applications, preparing them for MAT 230 (Calculus III) and MAT 232 (Differential Equations).
8. Statement of Relation to Curriculum(s): MAT 132 is a required course in the engineering science, mathematics and math-science programs and is an elective in the biology and business administration programs.
9. Catalog Course Description (Please include when course will be offered -- Fall, Spring, Summer, etc.):  
"A continuation of Analytic Geometry and Calculus I, which covers the calculus of inverse trigonometric, exponential and logarithmic functions, methods of integration, analytic geometry in the plane including polar coordinates and conic sections, hyperbolic and inverse hyperbolic functions, sequences and series, and parametric equations." The course is offered every semester, day and evening.

## 10. Course Outline

Syllabus

<u>Period</u>	<u>Text sections</u>	<u>Topics</u>
1- 3	7.1-3	Introduction; logarithms and exponential functions
4	7.4	Inverse functions
5	7.5	Logarithms and exponential functions, continued
6	7.6	Hyperbolic functions
7- 8	8.1-2	Inverse trigonometric functions
9	8.3	Inverse hyperbolic functions
10		Quiz no. 1
11	9.1	Use of tables of integrals
12	9.2	Integration by parts
13-14	9.3-4	Integration of powers of trigonometric functions
15-16	9.5-6	Trigonometric substitutions; partial fractions
17	9.7	Miscellaneous substitutions, including $z = \arctan(x/2)$
18	9.8	Trapezoidal approximations, Simpson's Method
19		Quiz no. 2
20-22	10.1-3	Improper integrals, L'Hopital's Rule, indeterminate forms
23-25	11.1-3	Sequences, infinite series
26-28	11.4-6	Convergence tests
29	11.7	Alternating series, conditional convergence
30		Quiz no. 3
31-34	11.8-11	Power, Taylor and Maclaurin series, computations
35	11.12	Differentiation, integration of series; Fourier series*
36-37	12.1-3	Conic sections, translation
38	12.4-5	Rotation of axes
39		Quiz no. 4
40-42	13.1-3	Polar coordinates
43	13.4	Parametric equations
44	13.5	Tangent lines, arc length in polar coordinates
45		Review or quiz no. 5

\*Important for engineering students; refer to notes or another textbook.



# COUNTY COLLEGE OF MORRIS

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MAT132 - ANALYTIC GEOMETRY AND CALCULUS II  
4 hrs/wk - 4 cr.

9/25/85

Catalog description: A continuation of Analytic Geometry and Calculus I, which covers the calculus of trigonometric, exponential and logarithmic functions, methods of integration, use of determinants, analytic geometry in the plane including polar coordinates and conic sections, hyperbolic functions, and series.

Pre-requisite: MAT131 or equivalent.

Text: Thomas and Finney, Calculus and Analytic Geometry, 6th ed. (Addison-Wesley).

Supplementary materials: None (see footnote).

Role of course: Required in the Mathematics program (2150), the Engineering Science program (2180), and the technical emphasis of the Computer Technology program (3500). Elective in these programs: Business Administration (2110), Humanities/Social Science (1130), Humanities/Art (1140), Mathematics/Physical Science (2151), Humanities/Music (1190), Mechanical Technology (3700), and these Honors programs: the Social Science option (1131) and the Mathematics/Science option (2153). Corequisite to PHY131. Prerequisite for ENR233, MAT228, MAT229, MAT230, MAT232 and PHY132.

## Syllabus

Period	Text sections	Topics
1- 2	6.1-3	Intro.; inverse trig functions, their derivatives
3	6.4-5	Natural logarithm and its derivative
4- 5	6.6-7	Exponential functions
6- 8	6.8-10	Logarithms to other bases; applications
9		Quiz no. 1
10-11	7.1-2	Integration formulas; integration by parts
12-14	7.3-5	Integration involving trig functions
15-16	7.6-7	Integrals involving quadratics; partial fractions
17	7.8-9	Improper integrals, misc. substitutions
18		Quiz no. 2
19	Pp. A1-6	Determinants
20-23	8.1-6	Conic sections, circles, parabolas, ellipses, hyperbolas
24-25	8.7-9	Quadratic curves; discriminants, sections of a cone
26		Quiz no. 3
27-29	9.1-4	Hyperbolic functions, inverse hyperbolic functions
30-31	10.1-2	Polar coordinates, graphs (plots) in polar coordinates
33-34	11.1-4	Sequences, limits of sequences, infinite series
35-37	11.5-7	Convergence, tests, absolute convergence
38		Quiz no. 4
39-40	12.1-2	Power series, Taylor's series
41	12.3	Computations with series
42	12.4	Indeterminate forms
43	12.5	Convergence and operations with power series
44		Fourier series (refer to other texts if necessary)
45		Review or quiz no. 5

Note: Students should be informed that the College bookstore has copies of Weir, Self-study Manual for Calculus and Analytic Geometry, which is coordinated with the textbook.