

# MAT-131: ANALYTIC GEOMETRY AND CALCULUS I

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**Time Stamp:**

Tue Jun 11 2024 14:11:15 GMT-0500 (CDT)

## Approval Path

- a. Thu, 02 Nov 2023 16:33:37 GMT  
Alexis Thurman (athurman): Approved for MATH Chair
- b. Sat, 11 Nov 2023 02:34:59 GMT  
Aslihan Cakmak (acakmak): Approved for BMET Dean
- c. Wed, 07 Feb 2024 15:05:11 GMT  
John Soltes (jsoltes): Approved for General Education Committee Chair
- d. Wed, 06 Mar 2024 13:15:52 GMT  
Christine Kelly (ckelly): Approved for Curriculum Committee Chair
- e. Wed, 13 Mar 2024 18:54:42 GMT  
Patrick Enright (penright): Approved for VPAA

## History

- a. May 4, 2018 by mshepard

Date Submitted: Mon, 24 Apr 2023 16:38:14 GMT

**Last approved: Fri, 04 May 2018 08:07:09 GMT**

**Last edit: Tue, 06 Feb 2024 17:57:56 GMT**

**Course Type:**

Credit

**Credit Type:**

Institutional

**Course Prefix:**

MAT

**Course Number:**

131

**Course Capacity:**

28

**General Education?**

Yes

**Department:**

Mathematics (MATH)

**Division:**

School of Business, Mathematics, Engineering and Technologies

**Course Title:**

Analytic Geometry and Calculus I

**Abbreviated Course Title:**

Analytic Geometry & Calculus I

**Effective Date:**

Spring 2023

**Credit Hours:****Lecture:** 4**Lab:****Recitation:****Clinical:****Cooperative:****Studio:****TOTAL:** 4**Catalog Credits:**

4

**Course Fee:**

No

**General Education Information****Categories:**

Mathematics

**Category Learning Outcomes Which Will Be Achieved:****Use quantitative analytical skills to evaluate and to process numerical data.****Catalog Course Description:**

The first semester of a three-semester sequence. Analytic geometry in the plane, differentiation and applications, and integration are covered.

**Catalog Prerequisites:**

MAT-123 (grade of C or better) or equivalent - Must be completed prior to taking this course.

**Crosslisted**

No

**Textbooks:**

Title	Ed	Author(s)	Publisher	ISBN	Req/Rec
Calculus of a Single Variable: Early Transcendental Functions	6th	Larson	Cengage	9781305714038	Required

**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.)****Course Content:****Topics**

Graphs, models, linear models, rates of change  
 Functions and their graphs, preview of calculus  
 Finding limits, evaluating limits analytically  
 Continuity, one-sided limits, infinite limits, limits at infinity  
 The derivative, the tangent line problem  
 Differentiation rules, rates of change  
 Product and quotient rules, higher derivatives  
 Chain Rule, implicit differentiation, related rates  
 L'Hôpital's Rule  
 Extrema, Rolle's Theorem, Mean Value Theorem  
 Increasing and decreasing functions  
 Concavity, second derivative test  
 Curve sketching, optimization, Newton's Method  
 Differentials  
 Indefinite integrals, areas

Riemann sums, definite integrals, fundamental theorem  
 Integrations by substitutions; average and r.m.s. values  
 Trapezoidal and Simpson's Rules  
 Natural logarithms, differentiation, integration; logarithmic differentiation  
 Inverse functions; exponential functions, derivatives, integrals  
 Bases other than e, applications, growth and decay  
 Inverse trigonometric functions, differentiation

**Statement of Course Learning Outcomes:**

**Learning Outcomes**

Demonstrate the concept of limits and evaluate limits of functions given their equations or their graphs  
 Differentiate functions involving algebraic and various transcendental functions  
 Solve basic applications of derivative problems such as distance, velocity, and acceleration, and tangent line problems and Newton's Method problems  
 Solve related rates, optimization problems involving various areas of study such as business, engineering, biology, chemistry, and physics  
 Sketch polynomial and rational functions using techniques of differentiation  
 Use various techniques of integration to evaluate indefinite integrals, and find areas under curves by evaluating definite integrals

**Statement of Relation to Curriculum(s):**

MAT-131 is a required course in the mathematics, chemistry, engineering science, scientific programming and math-science programs, and an elective in the biology and business administration programs.

**Format for offering the course:**

**(check all that apply)**

Traditional

Key: 3882