

MIDDLESEX COUNTY COLLEGE
EDISON, NJ
MASTER SYLLABUS

Course ID and Name: MAT 131, Analytic Geometry & Calculus I

Department: Mathematics

Prerequisites: MAT 129A/129B or MAT 129 - Precalculus, or appropriate placement score(s).

Co-requisites: None

Course Description: Presents fundamental ideas of calculus including the derivative, integral, and their applications. Topics include fundamentals of analytic geometry and transcendental functions. The first course in a sequence of calculus courses intended for the student interested in mathematics, engineering, and the natural, physical and social sciences. *TI 83 or TI 84 calculator required.*

General Education Status: GE MST

Credits: 4

Lecture Hours: 4

Lab Hours: 0

Textbook(s) and Other Course Materials:

e-tbook:

Author: Hartman, Siemers, Heinold, Calishajar

Title: Apex Calculus, Version 4.0

Online Platform: MyOpenMath

Core Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. Use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.
 - a. Translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations.
 - b. Construct graphs and charts, interpret them, and draw appropriate conclusions.
2. Communicate accurate mathematical terminology and notation to explain strategies to solve problems and interpret solutions.
3. Use technology correctly to solve mathematical problems.
4. Analyze and utilize the language of calculus, as well as the formal and mathematical definitions that accompany them.

Policies:

Disability Support

Students with disabilities, whether physical, learning or psychological, who believe that they may need accommodations in this class, are encouraged to contact Disability Services as soon as possible to ensure that the accommodations are implemented. Please meet with the Disability Services staff in Edison Hall, Room 100, (732) 906-2546.

Code of Student Conduct

To foster a productive learning environment, the College requires that all students adhere to the Code of Student Conduct which is published in the college catalog and website.

Content Strand	Students will be able to...
Graphs and Models, Linear Models and Rates of Change, Functions and Their Graphs (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Model functions graphically • Compute rates of change, algebraically and numerically
The Derivative, Tangent Lines, and Differentiation Rules (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Compute derivatives of functions both by applying the limit definition and by the rules of differentiation.
The Product and Quotient rules and Higher-Order Derivatives, The Chain Rule (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Compute derivatives of functions both by applying the limit definition and by the rules of differentiation.
Implicit Differentiation, Related Rates, Extrema on an Interval (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Compute derivatives of functions both by applying the limit definition and by the rules of differentiation. • Analyze algebraic and transcendental functions by the application of the first and second derivative tests. • Interpret and solve related rate and additional application problems using the methods of Calculus.
Rolle's Theorem and the Mean Value Theorem the First Derivative Test, and the Second Derivative Test (CLO 1, 3, 4)	<ul style="list-style-type: none"> • Compute derivatives of functions both by applying the limit definition and by the rules of differentiation. • Analyze algebraic and transcendental functions by the application of the first and second derivative tests.
Limits at Infinity (CLO 1, 3, 4)	<ul style="list-style-type: none"> • Interpret limits by graphical, numerical, and analytical methods.
Optimization Problems, Differentials, Antiderivatives and Indefinite Integration (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Evaluate integrals using basic formulae and integration by substitution. • Interpret and solve optimization and additional application problems using the methods of Calculus.
Area, Reimann Sums and Definite Integrals, and The Fundamental Theorem of Calculus (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Evaluate integrals using basic formulae and integration by substitution. • Apply the Fundamental Theorem of Calculus.
Integration by Substitution (CLO 1, 3, 4)	<ul style="list-style-type: none"> • Evaluate integrals using basic formulae and integration by substitution.
Natural Logarithms: Differentiation and Integration (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Compute derivatives of functions both by applying the limit definition and by the rules of differentiation. • Apply the Fundamental Theorem of Calculus. • Evaluate integrals using basic formulae and integration by substitution.
Exponential Functions: Differentiation and Integration, Bases other than e and applications (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Compute derivatives of functions both by applying the limit definition and by the rules of differentiation. • Apply the Fundamental Theorem of Calculus. • Evaluate integrals using basic formulae and integration by substitution.
Numerical Integration , Area of a Region Between Two Curves (CLO 1, 2, 3, 4)	<ul style="list-style-type: none"> • Apply the Fundamental Theorem of Calculus. • Evaluate integrals using basic formulae and integration by substitution.

