This course provides an overview of the differential calculus for single and multivariable functions and an introduction to the integral calculus and differential equations, with an emphasis on applications to the natural and physical sciences. Particular topics covered in the course include limits, ordinary and partial derivatives, applications of derivatives, definite integrals, fundamental theorem of calculus, applications of definite integrals, models involving differential equations, Eulers method, equilibrium solutions.

**A. Course Description**

Credits: 4

Prerequisites: MATH 120 Precalculus

Lab Hours/ Weeks: Corequisites: None

Lecture Hours/ Week :

MnTC Goals: None

B. Course Effective Dates: 01/13/2014 - Present

C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Understand and be able to apply the concept of a derivative for single and multivariable functions in diverse contexts.
2. Understand and be able to apply the concept of a definite integral for single-variable functions in diverse contexts.
3. Be able to use derivatives and partial derivatives to discern graphical properties of single and multivariable functions, including extrema and asymptotes.
4. Understand and be able to interpret calculus-based mathematical models in science related to, for example, population growth, enzyme kinetics, metabolism, epidemiology, drug and pollutant dynamics, natural selection, biomechanics, radiation, etc.
5. Understand and be able to apply differentiation rules, including the product, quotient, and chain rule to calculate derivatives of functions involving polynomial, exponential, logarithmic, and trigonometric functions.
6. Understand and be able to calculate definite and indefinite integrals of polynomial, exponential and trigonometric functions.
7. Understand and be able to numerically calculate derivatives, partial derivatives, and definite integrals.

E. Learning Outcomes (MN Transfer Curriculum)

This contains no goal areas.

G. Special Information

Note: Students whose prerequisites are not identified by the system would contact the Math and Statistics Department for an override at MATH@metrostate.edu. First day attendance required except by instructor permission.