

Last Day to Drop or Withdraw from Classes: (Verify Date on calendar or with Records Office)

## MATH 1830

## Applied Calculus

### Credit Hours

3 credit hours

### Course Description

Topics include limits; continuity, rates of change; differentiation of algebraic, exponential, and logarithmic functions; applications of the derivative, antiderivative, integrals, and methods of integration. No student who has received a grade of C or better in MATH 1910 (Calculus I) may subsequently receive a grade in MATH 1830.

### Prerequisite Course(s)

MATH 1710 (Precalculus Algebra) or equivalent

### Text

Bittinger. Calculus and Its Applications. 10e, Pearson  
ISBN: 0321728602 – Bundle with MML

### Other text or materials required

A calculator with exponential and logarithmic capabilities.

### Academic Honesty

Acts of academic dishonesty are serious offences at JSCC. Suspension from the college could be the consequence for any act of dishonesty. No form of cheating will be tolerated. See the JSCC catalog for additional information.

### Prerequisite Competencies

It is expected that students have mastery of these prerequisite competencies. These topics will not be covered during class time. If assistance is needed regarding these topics, please use the services and materials provided by the Academic Assistance Center and Math Learning Center.

Competencies include but are not limited to:

- Evaluate polynomial functions, piecewise-defined functions, exponential functions, logarithmic functions and functions with negative and/or fractional exponents.
- Simplify rational expressions, complex fractions, logarithmic expressions, exponential expressions, and radical expressions.
- Solve polynomial equations (especially linear equations in one variable and quadratic equations in one variable), literal equations, fractional equations, and radical equations.
- Solve inequalities in one variable (both linear and nonlinear).
- Apply the Laws of Exponents (including negative exponents and rational exponents).
- Solve a nonlinear system of equations.
- Graph functions including linear functions, quadratic functions, and piecewise-defined functions.
- Utilize functional notation.
- Identify the key elements in an application problem, and set up an appropriate equation or system of equations to represent the situation.
- Employ basic geometric concepts (The Pythagorean Theorem, the area and perimeter of a rectangle, the area and circumference of a circle, the volume of a sphere, a cone, and a cylinder, and the surface area of a sphere and a cylinder) to set up application problems.

## Exit Competencies:

Upon successful completion of this course, a student will demonstrate comprehension and application of the following competencies.

- Evaluate limits, both finite and infinite, involving polynomial functions
- Evaluate limits involving rational functions
- Evaluate limits involving piecewise-defined functions
- Evaluate limits involving complex fractions
- Evaluate limits involving radical expressions
- Use the concepts of a limit to discuss the continuity (or discontinuity) of a polynomial function
- Use the concepts of a limit to discuss the continuity of a rational function
- Use the concepts of a limit to discuss the continuity of a piecewise-defined function
- Employ the concepts of a limit to determine the asymptotes (both vertical and horizontal) of a rational function
- Find the derivative of a polynomial function using the definition of the derivative
- Use the basic rules for differentiation to find the derivative of polynomial functions
- Use the basic rules for differentiation to find the derivative of rational functions
- Use the basic rules for differentiation to find the derivative of exponential functions
- Use the basic rules for differentiation to find the derivative of logarithmic functions
- Use the basic rules for differentiation to find the derivative of implicit functions
- Use the derivative to solve application problems involving rate of growth, marginal analysis, velocity and acceleration, slope, the differential, related rates, and the theory of extremes
- Determine the intervals in which a function is increasing and the intervals in which a function is decreasing by analyzing the graph of the function and by utilizing appropriate algebraic procedures on the derivative of the function
- Use the derivative of a function to determine the extreme points (both relative and absolute) of the function
- Find the integral (both definite and indefinite) of polynomial functions
- Find the integral of rational functions
- Find the integral of exponential functions
- Find the integral of functions involving a radical
- Use the integral (definite or indefinite) to solve application problems involving the antiderivative, slope, rates of growth, rates of decay, velocity and acceleration, area, and marginal analysis

## Writing Competency

None

## Support Facilities

Most JSCC math courses are supported with tutoring during the Fall and Spring semesters. See your instructor for specific tutoring opportunities available at JSCC. These facilities are not a substitute for attending class. Math tutors are not allowed to introduce new material to a student. If a class must be missed, the student must obtain class notes from a classmate and then meet with the instructor BEFORE seeking tutoring on the missed material.

### ADA

Jackson State will make reasonable accommodations for students with documented disabilities. Students should notify their instructor and Linda Nickell, Dean of Students, in the Counseling Office, Room 139 of the Student Union Building. The contact number is 425-2616 and the email is [lnickell@jsc.edu](mailto:lnickell@jsc.edu). Instructors should be notified the first week of class. All discussions remain confidential.