Northwest Arkansas Community College
Science and Mathematics Division

Discipline Code
MATH

Course Number
2043

Course Title
Survey of Calculus

Catalog Description
(F, S, SUM) A survey and applications course in calculus designed for students in business, life sciences and social sciences. Topics include limits, differentiation, curve sketching, exponential and logarithmic functions with applications, integration and multivariable calculus. Computer assisted, WWW, and hybrid versions of this course may be offered in addition to the traditional format. Prerequisite: College Algebra (MATH 1203) or College Algebra with Review (MATH 1203R) with a C or better, or appropriate placement scores (see placement chart). NOTE: Survey of Calculus is NOT a prerequisite for Calculus I (MATH 2554).

Prerequisites
College Algebra (MATH 1203) or College Algebra with Review (MATH 1203R) with a C or better, or appropriate placement scores.

Credit Hours
3 credit hours

Contact hours
45 lecture contact hours

Load hours
3 load hours

Semesters Offered
Fall, Spring & Summer

ACTS Equivalent
MATH2203 Survey of Calculus

Grade Mode
A-F

Learning Outcomes
Students completing this course will:

- Algebraically, analytically, and graphically evaluate limits.
- Find basic derivatives using the definition, product, quotient and chain rules, and by implicit differentiation.
- Understand and apply derivatives appropriately to real-world problems to optimize functions and to find instantaneous rates of change, marginal cost, marginal profit, relative rates of change, elasticity of demand, etc.
- Graph functions by hand, including manually finding the extrema using the first derivative test, intervals where the graph is increasing or decreasing, intervals of concavity, and finding points of inflection.
- Integrate "basic" integrals including polynomial functions, exponential functions, and log functions.
- Apply integrals appropriately to find the areas under and between curves, average value, accumulated value, consumer's surplus and producer's surplus.
- Find partial derivatives and use them to optimize functions of several variables, including using constrained optimization and Lagrange Multipliers.

General Education Outcomes Supported
- Students can achieve mathematical literacy.

Standard Practices
Topics list
- Finding limits numerically, graphically, and algebraically
- Function continuity
- Average rates of change
- Differentiation using limits of difference quotients
- Finding derivatives of a variety of functions using the sum-difference rules, the product rule, the quotient rule, the chain rule
- Finding higher order derivatives and implicit derivatives
- Using the first and second derivatives to classify maximum and minimum values, and sketch graphs
- Applications of derivatives including optimization, marginal cost, marginal revenue, marginal profit, elasticity of demand, and related rates
- Antidifferentiation, and antiderivatives as areas
- Definite integrals and their properties
- Integration by substitution
- Applications of integrals including average value, consumer surplus, and producer surplus
- Functions of several variables and their partial derivatives
- Maximum and minimum problems for functions of several variables
- Constrained optimization using Lagrange Multipliers

Learning activities
- Instructors must cover all the topics listed. Instructors may cover additional topics if they wish.
- Instructors should include learning activities in their courses that develop these outcomes and identify them in course syllabi. Instructors should describe how these activities will be evaluated in their course syllabi and/or reflected in their gradebooks.

Assessments
- Each instructor will include a set of departmental assessment questions on their assessment tool.

- These questions will be in direct support of the learning outcomes.
- Department-wide results for these questions will be reported when final grades are submitted.
  ## Grading guidelines
- At least 70% of the student's final course grade should come from proctored work.