Northwest Arkansas Community College

Science and Mathematics Division

Discipline Code
MATH

Course Number
2554

Course Title
Calculus I

Catalog Description
The first course in a three-semester sequence designed to provide comprehensive coverage of differential and integral calculus. Topics include limits and continuity, differentiation with applications, and introduction to integration with applications.

Prerequisites
Prerequisites: Plane Trigonometry (MATH 1213) OR Pre-calculus Mathematics (MATH 1285) with a C or better, or appropriate placement scores (See Placement Chart).

Credit Hours
4 credit hours

Contact hours
60 contact hours

Load hours
4 load hours

Semesters Offered
Fall, Spring, On Demand

ACTS Equivalent
MATH 2405, Calculus I

Grade Mode
A-F

Learning Outcomes

Upon successful completion of MATH 2554 students will exhibit mastery of certain knowledge and basic skills. These skills include, but are not limited to:

- Analyze and evaluate limits (including infinite limits) graphically, numerically, and analytically.
- Analyze functions for continuity.
- Evaluate limits using L'Hopital's rules.
- Evaluate derivatives by the limit process.
- Memorize basic differentiation rules.
- Evaluate derivatives for algebraic, trigonometric, inverse trigonometric, exponential and logarithmic functions and combinations thereof using basic differentiation rule including the product, quotient and chain rules.
- Compute derivatives using implicit differentiation.
- Evaluate derivatives using logarithmic differentiation.
- Apply differentiation rules to evaluate rate of change and find equations of tangent lines
- Solve related rate problems using differentiation.
- Use differentiation techniques to evaluate absolute extrema.
- Apply differentiation techniques to find intervals of increasing, decreasing and concavity, relative extrema and points of inflection.
- Demonstrate knowledge of curve sketching.
- Apply differentiation techniques to solve optimization problems.
- Memorize basic integration rules.
- Evaluate integrals and areas using the limit definition of definite integrals.
- Evaluate definite integrals using the Fundamental Theorem of Calculus.
- Evaluate definite and indefinite integrals using substitution.

- ## General Education Outcomes Supported

- Students develop higher order thinking skills.
- Students achieve mathematical literacy

Standard Practices

Topics list

- Limits
- Continuity
- Derivatives
- Applications of Derivatives including related rates, graphing, and optimization
- Integration

Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic. Faculty may add to these outcomes, but may not omit any of them.
- The content of the course may be taught with or without the use of a graphing calculator as deemed appropriate by the instructor.

Assessments

- There will be a common departmental portion on the required comprehensive final exam.
- These questions will be in direct support of the Learning Outcomes.
- Instructors will report the results of the individual departmental questions when grades are submitted.

Grading Guidelines

- At least 70% of the student's final grade should come from proctored work.

Last Revision Date: Spring 2022