

Marshall University

College of Science

Mathematics Department

## **MTH 132: Precalculus with Science Applications**

### **Course catalog description**

Functions used in calculus including polynomial, rational, exponential, logarithmic, and trigonometric. Systems of equations and inequalities, conic sections, polar and parametric equations, sequences and series, Binomial Theorem.

### **Credit hours**

5 hours

### **Prerequisites**

ACT Math 24 or SAT Math 560, or a grade of C or higher in MTH 127 or MTH 130

### **List of topics**

- Very brief review of basic concepts of algebra, including
- Solving quadratic equations (with complex roots) and other equations and inequalities (ex. piecewise and absolute value)
- The definition of a function, including their graphs and properties (increasing, decreasing, average rates of change)
- The composition of functions and the resulting functions domain,
- Inverses of functions,
- scaling and translating the graphs of functions (graph transformations)
- Polynomial functions, division, Factor and Remainder Theorem, Fundamental Theorem of Algebra, optimizing quadratic functions, inequalities
- Rational functions, domains, finding asymptotes, inequalities
- Exponential functions, logarithmic functions and properties, equation solving, and basic modeling (interest, growth and decay)

- Right triangle trigonometry, law of sines and cosines, unit circle trigonometry
- Graphing the six trig functions and transformations of sine, cosine, and tangent
- Verifying identities and solving trig equations
- Modeling with trigonometric functions
- Polar and parametric equations, and 2D vectors (including dot product)
- Solving systems of linear equations using substitution and elimination (up to 3x3)
- Matrix operations and using matrices to solve systems of linear equations
- Sequences, series, The Binomial Theorem, and some of their applications

### **Learner Outcomes**

1. Students will further develop algebraic skills (ex. solving equations) which are essential in calculus
2. Students will learn about trigonometric functions and their applications with an intent for calculus
3. Students will learn about the functions which are used in calculus (ex. graphing and other properties)
4. Students will learn which functions are appropriate for modeling different types of growth and change

### **Suggested textbooks**

- Stewart, *Algebra & Trigonometry*, 4th edition, ISBN 978-1-30-507174-2
- Larson, *Algebra & Trigonometry*, 9th edition, ISBN 978-1-13-395974-8

### **Last updated**

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