

SYLLABUS

MATH 12001 – Pre-Calculus

(5 Credit Hours)

Catalog Information: Introduction to algebra and trigonometry including functions and graphs; polynomial and rational functions; exponential and logarithmic functions; angles and the trigonometric functions; graphs of trigonometric functions; trigonometric identities; inverse circular functions and trigonometric equations; and applications of trigonometry. No credit for this course if student earned credit for MATH 10774 or MATH 10775 or MATH 11010 or MATH 11022. Prerequisite: MATH 10024 with a minimum grade of B (3.0); or minimum ALEKS® math placement assessment score of 67.

A student who is considering taking this course in lieu of MATH 11010 + MATH 11022 should contact an advisor before registering.

Text: Precalculus, 6th Edition, Stewart, Cengage. **Software:** Enhanced Webassign.

Functions and Graphs (14 days)

- Functions in general
- Definition and function notation – formalize the types of functions studied in Core Mathematics courses
- Images, domain/range (in context and symbolically)
- Increasing/decreasing; odd/even
- Solving linear equations and systems (algebraic and graphical approaches)
- Piecewise functions
- Operations on Functions
 - Adding and subtracting functions – graphical, numerical, symbolic
 - Multiplying functions – graphical, numerical, and symbolic
 - Composition of functions – graphical, numerical, symbolic
- Graphing techniques
 - Symmetry with function notation
 - Horizontal and vertical translations with algebraic and trigonometric functions
 - Vertical stretches and compressions – non-rigid transformations
- Modeling
 - Linear
 - Quadratic
 - Exponential

(MATH 12001 Syllabus, continued)

Polynomial and Rational Functions (7 days)

- Quadratic functions – non-real zeros (definition of complex numbers)
- Graphs of power functions, end behavior of polynomial functions, multiplicities
- Synthetic division, Remainder Theorem, Factor Theorem
- Complex zeros and Fundamental Theorem
- Rational Functions – domains, graphs, asymptotes
- Polynomial and rational inequalities

Exponential and Logarithmic Functions (9 days)

- One-to-one functions and inverses
- Logarithmic & exponential functions
- Properties of logarithms
- Logarithmic and exponential equations
- Applications

Conic Sections, Arithmetic and Geometric Sequences and Series (8 days)

- Quadratic polynomials in two variables (“conics”) and their applications
- Sequences (expressed recursively and explicitly)
- Summation notation and partial sums of sequences
- Sum formulas for arithmetic and geometric sums and geometric series

Angles and the Trigonometric Functions (5 days)

- Angle an degree measure
- Radian measure, arc length, and area
- Trigonometric functions
- Right triangle trigonometry
- Fundamental identity and reference angles

Graphs of Trigonometric Functions (7 days)

- The unit circle and graphing
- The general sine wave
- Graphs of reciprocal of sine and cosine
- Graphs of tangent and reciprocal tangent functions

Trigonometric Identities (7 days)

- Basic identities
- Verifying identities
- Sum and difference identities for cosine
- Sum and difference identities for sine and tangent
- Double-angle and half angle identities
- Product and sum identities

(MATH 12001 Syllabus, continued)

Inverse Circular Functions and Trigonometric Equations (5 days)

- Inverse trigonometric functions
- Solving trigonometric equations
- Applications of Trigonometry (6 days)
- The Law of Sine
- The Law of Cosines
- Area of a Triangle
- Vectors
- Applications of Vectors

FINAL EXAM

75 Days Total

(6 exam days plus 1 day review for the final)