Faculty members are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT. **MATH** COURSE NUMBER: **1113**

NUMBER OF CREDITS: _______ Lecture: 4 Lab: _______

**Course Title:**
Precalculus

**Catalog Description:**
Reviews the concepts of college algebra and then extends those ideas to trigonometry and analytic geometry. Exponential, logarithmic, and polynomial functions are emphasized in the review. The course explores rectangular coordinates and angles, solutions of right triangles, unit circles, radian measure, trigonometric functions and their inverses, trigonometric graphs, trigonometric equations and identities, complex numbers, conic sections, and other analytic geometry topics such as polar coordinates, parametric equations, sums and geometric series, and vectors. Pre-requisite: MATH 1111 or Multiple Measures Grid

**FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)**

Goal 4: Mathematics/Logical Reasoning: **X** by meeting the following competencies:

- Illustrate historical and contemporary applications of mathematics/logical systems.
- Clearly express mathematical/logical ideas in writing.
- Explain what constitutes a valid mathematical/logical argument (proof).
- Apply higher-order problem-solving and/or modeling strategies.

**Prerequisites or Necessary Entry Skills/Knowledge:**
MATH 1111 or Multiple Measures Grid

**Topics to be Covered (General)**
- Concept of a function and their graphs
- Inverse Trig functions
- Trig form of complex numbers
- Vectors and the Dot product
- Systems of Equations of two and several variables
- Systems of linear equations and matrices
Inverses of matrices and matrix equations
Determinants and Cramer’s Rule
Systems of inequalities
Partial Fractions
Conic Sections—parabolas, ellipses, hyperbolas
Polar coordinate system
Polar equations of conics
Parametric equations
Arithmetic sequences and series
Geometric series and applications
Mathematical Induction
Function notation, including piecewise defined functions and absolute value functions
Transformations of functions and their graphs
Compositions, Inverses, and Combinations of functions
Linear functions and data modeling
Proportionality, rates, and rates of change
Polynomial, power, and rational functions
Complex numbers
Fundamental Theorem of Algebra
Exponential and logarithm functions and modeling
Trigonometric functions of real numbers
The unit circle concept and trigonometric graphs
Trigonometric functions of angles and right triangle definitions
Law of Sines and Cosines
Trigonometric identities, equations, and modeling periodic behavior

**Student Learning Outcomes**

- Define algebraic and trigonometric concepts in four ways: verbally, analytically, numerically and visually.
- Demonstrate skills to solve equations and inequalities and to simplify or expand expressions.
- Recognize and apply different types of functions and relations.
- Implement functions and relations to model real-world applications and predict outcomes from modeling data.
- Communicate mathematical ideas in writing.

**Is this course part of a transfer pathway:** Yes [ ] No [X]

*If yes, please list the competencies below*

Revised 12/19