DATE OF LAST REVIEW: 01/2014
CIP CODE: 24.0101
SEMESTER: Departmental Syllabus
COURSE TITLE: Pre-Calculus Mathematics
COURSE NUMBER: MATH0108
CREDIT HOURS: 5
INSTRUCTOR: Departmental Syllabus
OFFICE LOCATION: Departmental Syllabus
OFFICE HOURS: Departmental Syllabus
TELEPHONE: Departmental Syllabus
EMAIL: Departmental Syllabus

KCKCC-issued email accounts are the official means for electronically communicating with our students.

PREREQUISITES: First Time Placement: See Mandatory Placement Guidelines. Grade of “C” or higher in MATH0104 Intermediate Algebra.

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, http://www.kckccbookstore.com for the required text for your particular class. The TI-83 or 84 Series graphing calculator is required.

COURSE DESCRIPTION: Pre-Calculus includes the analysis and graphing of functions, including constant, linear, absolute value, square root, polynomial, rational, exponential and logarithmic functions, non-functions and trigonometric functions; solving equations and inequalities, including polynomial equations, exponential equations, logarithmic equations, trigonometric equations, systems of linear equations and inequalities; trigonometric and inverse trigonometric functions, radian and degree measure, identities, and applications to physical problems; conic sections; and sequences and series.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:
I. Functions, Graphs, and Models
   A. Characteristics
   B. Regression line
   C. Symmetry
   D. Translations
   E. Combining functions
F. Variation

II. Functions and Equations
A. Linear
B. Applications
C. Quadratic
D. Rational and radical
E. Absolute value
F. Linear inequalities

III. Polynomial and Rational Functions
A. Graph
B. Applications
C. Inequalities

IV. Exponential and Logarithmic Functions
A. Inverse
B. Exponential
C. Logarithmic
D. Exponential and logarithmic equations
E. Applications

V. Trigonometric functions
A. Right triangle definition
B. Unit circle definition

VI. Right Triangles
A. 30 degree angle
B. 45 degree angle
C. 60 degree angle

VII. Radian measurement
A. Angles
B. Circular functions

VIII. Graphs
A. Sine, cosine, and tangent functions
B. Secant, cosecant, and cotangent functions

IX. Trigonometric identities
A. Double angle and half angle identities
B. Sum and difference identities

X. Inverse trigonometric functions
A. Graph
B. Analyze

XI. Equations
A. Sine, cosine, and tangent
B. Secant, cosecant and cotangent

XII. Oblique triangles
A. Law of cosines
B. Law of sines
XIII. Applications  
A. Distance  
B. Elevation  

XIV. Systems  
A. Substitution, elimination, and graphing  
B. Matrices  

XV. Conic Sections  
A. Parabolas  
B. Ellipses  
C. Hyperbolas  

XVI. Sequences and Series  
A. Arithmetic  
B. Geometric  

EXPECTED LEARNER OUTCOMES:  
A. The student will be able to graph and model using functions.  
B. The student will be able to find zeros of functions and solutions of equations.  
C. The student will be able to graph functions and solve equations (polynomial and rational).  
D. The student will be able to graph functions and solve equations (exponential and logarithmic).  
E. The student will be able to define trigonometric functions.  
F. The student will be able to solve right triangles.  
G. The student will be able to use radian measurement and circular functions.  
H. The student will be able to analyze trigonometric graphs.  
I. The student will be able to verify trigonometric identities.  
J. The student will be able to use inverse trigonometric functions.  
K. The student will be able to solve trigonometric equations.  
L. The student will be able to solve oblique triangles.  
M. The student will be able to solve trigonometric applications.  
N. The student will be able to solve systems of equations.  
O. The student will be able to graph and find equations for the conic sections.  
P. The student will be able to use sequences and series.  

COURSE COMPETENCIES:  
Upon successful completion of the course:  

_The student will be able to graph and model using functions._  
1. The student will be able to find the domain, range, intercepts, and relative extrema of a function.  
2. The student will be able to fit a regression line to a set of data; then use the linear model to make predictions.  
3. The student will be able to determine whether a graph is symmetric.  
4. The student will be able to graph the transformation of a function.  
5. The student will be able to compute function values for the sum, the difference, the product, and the quotient of two functions, and determine the domains.  
6. The student will be able to find equations of direct, inverse, and combined variation.  

_The student will be able to find zeros of functions and solutions of equations._  
7. The student will be able to find zeros of linear functions and solve linear equations.  
8. The student will be able to solve applied problems using linear models.  
9. The student will be able to solve quadratic equations by completing the square and using the quadratic formula.
10. The student will be able to find zeros of rational and radical functions and solve rational and radical equations.
11. The student will be able to find zeros of absolute value functions and solve absolute value equations.
12. The student will be able to solve linear inequalities using interval notation to express solution sets.
   The student will be able to graph functions and solve equations (polynomial and rational).
13. The student will be able to graph a polynomial function.
14. The student will be able to solve applied problems using polynomial models.
15. The student will be able to graph a rational function.
16. The student will be able to solve applications involving rational functions.
17. The student will be able to solve polynomial and rational inequalities.
   The student will be able to graph functions and solve equations (exponential and logarithmic).
18. The student will be able to determine whether a function is one-to-one and find a formula for its inverse.
19. The student will be able to graph exponential equations and functions.
20. The student will be able to graph logarithmic functions.
21. The student will be able to solve exponential and logarithmic equations.
22. The student will be able to solve applications involving exponential and logarithmic functions and their graphs.

The student will be able to define trigonometric functions.
23. The student will be able to define trigonometric functions using the right triangle.
24. The student will be able to define trigonometric functions using the unit circle.
   The student will be able to solve right triangles.
25. The student will be able to use 30 degree angles.
26. The student will be able to use 45 degree angles.
27. The student will be able to use 60 degree angles.
   The student will be able to use radian measurement and circular functions.
28. The student will be able to define a radian measure.
29. The student will be able to use circular functions.
   The student will be able to analyze trigonometric graphs.
30. The student will be able to analyze graphs using the sine, cosine, and tangent functions.
31. The student will be able to analyze graphs using the secant, cosecant, and cotangent functions.
   The student will be able to verify trigonometric identities.
32. The student will be able to verify the double angle and the half angle identities.
33. The student will be able to verify the angle sum and the angle difference identities.
   The student will be able to use inverse trigonometric functions.
34. The student will be able to graph inverse trigonometric functions.
35. The student will be able to analyze inverse trigonometric functions.
   The student will be able to solve trigonometric equations.
36. The student will be able to solve equations using sine, cosine and tangent functions.
37. The student will be able to solve equations using secant, cosecant and cotangent functions.
   The student will be able to solve oblique triangles.
38. The student will be able to use the Law of Cosines.
39. The student will be able to use the Law of Sines.
   The student will be able to solve trigonometric applications.
40. The student will be able to solve distance applications.
41. The student will be able to solve elevation applications.
The student will be able to solve systems of equations.

42. The student will be able to solve a system of two linear equations in two variables using substitution, elimination, and graphing.

43. The student will be able to solve systems of equations using matrices.

44. The student will be able to graph and find equations for the conic sections.

45. The student will be able to find the center, the vertices, and the foci and graph an ellipse given its equation.

46. The student will be able to find the center, the vertices, and foci and graph a hyperbola given its equation.

47. The student will be able to find the vertex, the focus, and directrix and graph a parabola given its equation.

48. The student will be able to identify the common ratio of a geometric sequence, and find a given term and the sum of the first $n$ terms.

**ASSESSMENT OF LEARNER OUTCOMES:**
Student progress is evaluated by means that include, but are not limited to, exams, written assignments, and class participation.

**SPECIAL NOTES:**
Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student’s progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college’s policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the Director of the Academic Resource Center, in Rm. 3354 or call at: 913-288-7670.