Title: College Preparatory Mathematics III
Abbreviation and Number: MATH048
Unit: Continuing Education and Extension Services
Department: Academic Upgrading
Credits: 0
Course Sequence: ( ) Fall ( ) Spring (X) Fall and Spring
Hours Per Week: (3) Lecture ( ) Seminar ( ) Laboratory ( ) Studio ( ) Kitchen ( ) Other (Specify)
Pre-requisite(s): MATH047 or placement at MATH048
Co-requisite(s): None

COURSE DESCRIPTION
This is the third in a series of three College Preparatory Mathematics courses. With the aid of technology, students study elementary algebra, graphs, linear inequalities, elementary matrix operations, mensuration and basic sequences.

SPECIFIC OBJECTIVES
Upon successful completion of this course, students will be able to
1) solve algebraic equations including simple linear, fractional, simultaneous and quadratic by more than one method;
2) determine areas and volumes related to plane figures and solids;
3) identify types of matrices;
4) perform mathematical operations on matrices including their use in the solution of simultaneous linear equations;
5) solve linear inequalities;
6) plot linear and quadratic graphs and use them to solve simultaneous equations;
7) identify arithmetic progressions and geometric progressions; and
8) find specified terms and sum of finite terms.

COURSE CONTENT
I. Algebra
   A. Use of basic scientific calculator
      i. Addition
      ii. Subtraction
      iii. Multiplication
      iv. Division
      v. Square root
      vi. General powers \( x^y, y^x, \sqrt{y} \)
      vii. Reciprocals
      viii. Brackets
      ix. The scientific notation
      x. Second function key
   B. Simple and fractional linear equations with numerical denominators
   C. Equations of the form \( \frac{a}{b} = \frac{c}{d} \) which reduce to linear equations
   D. Simultaneous linear equations
Course Outline

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i. Elimination
ii. Substitution

E. Factorising quadratic expressions
   i. Perfect squares
   ii. Difference of the squares

F. Solution of quadratic equations
   i. Factors
   ii. Formula

G. Solution of simple problems
   i. Linear
   ii. Simultaneous
   iii. Quadratic equations

H. Transposing formulas

II. Graphs

A. Linear graphs
   i. Review plotting lines
   ii. Graphical solutions of simultaneous linear equations
   iii. Gradients
   iv. Parallel lines
   v. Equations of lines in the form $y = mx + c$ and $Ax + By = C$

B. Plotting quadratic graphs
   i. Symmetry
   ii. The vertex

C. Intersections of linear and quadratic graphs

III. Linear Inequalities

A. Review
   i. Solving simple linear inequalities
   ii. Graphing solutions on number line

B. Solving word problems

C. Cartesian plane – graphing the solution set of linear inequalities in two variables

IV. Matrices

A. Using matrices
   i. Order
   ii. Special types
      a. Row
      b. Column
      c. Square
      d. Diagonal
      e. Identity

B. Matrix operations
   i. Addition
   ii. Subtraction
   iii. Scalar and matrix multiplication
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iv. Transposition
C. Inverse matrices for 2 x 2 matrices
D. Simultaneous linear equations using matrix inverse

V. Mensuration
A. Problems involving areas of plane figures
   i. Rectangles
   ii. Triangles
   iii. Circles
   iv. Trapezoids
   v. Parallelograms
B. Lengths of arcs and areas of sectors of circles
C. Volumes
   i. Uniform cross-sectional area
   ii. Cuboids
   iii. Spheres
   iv. Cones
   v. Frustums of cones (as the difference of two cones)
D. Problems involving volumes
E. Surface areas
   i. Cuboids
   ii. Solids of uniform cross-sectional area

VI. Basic Sequences
A. Number sequences
   i. Addition
   ii. Multiplication
B. Arithmetic progression
   i. Nth term
   ii. Sum of n terms
C. Geometric progression
   i. Nth term
   ii. Sum of n terms

ASSESSMENT
Assignments (at least 6 assignments/quizzes in total)…… 30%
Two In-Semester Examinations (20% each) ……………… 40%
Final Examination………………………………………… 30%
TOTAL…………………………………………………………100%

REQUIRED RESOURCE
Matheletics Access Code

REQUIRED TEXT
SUPPLEMENTARY READINGS/MATERIALS

WEBSITES
www.matheletics.com (Matheletics)
www.wiziq.com/tutorials/improve-student-success-developmental-mathematics (Improve Student Success Developmental Mathematics)