Effective Implementation date: Spring 2018, 201830

Course Prefix and Number: MAT156
Course Title: Integrated Math: MA-1
Course Credits: 3
Course Description: engages students in the concepts underlying elementary level mathematics. The course emphasizes depth of understanding, critical thinking, and applications. Topics include probability, statistics, measurement, Euclidean geometry, and algebraic methods.

Guaranteed Transfer (GT) Pathways Course Statement:
The Colorado Commission on Higher Education has approved MAT156 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT-MA1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to
https://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html.

GT-MA1: MATHEMATICS CONTENT CRITERIA
Students should be able to:
   a) Demonstrate good problem-solving habits, including:
      - Estimating solutions and recognizing unreasonable results.
      - Considering a variety of approaches to a given problem, and selecting one that is appropriate.
      - Interpreting solutions correctly.
   b) Generate and interpret symbolic, graphical, numerical, and verbal (written or oral) representations of mathematical ideas.
   c) Communicate mathematical ideas in written and/or oral form using appropriate mathematical language, notation, and style.
   d) Apply mathematical concepts, procedures, and techniques appropriate to the course.
   e) Recognize and apply patterns or mathematical structure.
   f) Utilize and integrate appropriate technology.

GT-MA1 COMPETENCY & STUDENT LEARNING OUTCOMES
Competency: Quantitative Literacy:
Students should be able to:
   1. **Interpret Information**
      a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
   2. **Represent Information**
      a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

3. **Perform Calculations**
   a. Solve problems or equations at the appropriate course level.
   b. Use appropriate mathematical notation.
   c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.
4. **Apply and Analyze Information**
   a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.
   b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
   c. Make judgments based on mathematical analysis appropriate to the course level.
5. **Communicate Using Mathematical Forms**
   a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

REQUIRED COURSE LEARNING OUTCOMES
   I.   Determine the probability of various events.
   II.   Interpret data using statistical tools.
   III. Build a system of geometric relationships.
   IV.   Construct geometric models using geometric principles.
   V.   Make use of geometric properties and formulas.
   VI.   Solve problems involving units of measure.
   VII. Solve problems involving algebraic methods.
   VIII. Use technology as appropriate.

RECOMMENDED COURSE LEARNING OUTCOMES
   I.   Interpret current elementary level mathematics standards.

REQUIRED TOPICAL OUTLINE
1. Probability of various events
   a) Vocabulary
   b) Interpretation of probabilities
   c) Experimental determination of probability
   d) Theoretical probability
   e) Addition and multiplication rules
2. Data using statistical tools
   a) Sampling techniques
   b) Identification of bias and abuses of statistics
   c) Graphical representation of data including line plots, picture graphs, bar graphs, histograms, and box plots
   d) Measures of central tendency
   e) Measures of spread
   f) Measures of relative position including quartiles and percentiles

3. Geometric relationships
    a) Definitions, assumptions, axioms, and theorems
    b) Classification of plane figures including triangles, quadrilaterals, polygons, angle types, and circles
    c) Classification of three dimensional figures including prisms, cylinders, cones, spheres, and pyramids Composite two dimensional figures
    d) Symmetry including reflection (line) and rotational (point)
    e) Congruence and similarity of polygons, line segments, and angles
    f) Introduction to Cartesian coordinates
4. Geometric models using geometric principles
    a) Constructions
    b) Geometric transformations including reflections, rotations, and translations M5
    c) Tessellations
5. Geometric properties and formulas
    a) Perimeter
    b) Area
    c) Surface area
    d) Volume
    e) Similar triangles
    f) Problem solving using geometric principles
6. Problems involving units of measure
    a) Angle measurement both with protractors and angle relationships
    b) Systems of units including metric and American standard
    c) Mass and weight
    d) Unit conversions
7. Problems involving algebraic methods.
    a) Introduction to variables
    b) Independent and dependent variables with equations, tables, and graphs
    c) Simplification of algebraic expressions
    d) Properties of exponents
    e) Algebraic properties of equality and inequality
    f) Solving basic linear equations
    g) Numerical sequences including arithmetic, geometric, and others
8. Technology use as appropriate