MTH 135 INTRODUCTION TO TECHNICAL MATHEMATICS (revised 11/16/2015)

The purpose of this course is to develop an intuitive feeling for mathematical methods without emphasizing mathematical rigor. The student will be expected to use algebra, geometry, trigonometry, and graphing techniques to solve practical problems from various technologies. A comprehensive departmental final exam testing the degree of mastery of the following course objectives is required.

1. Approximate Numbers and Measurements
    1.1 Review arithmetic involving decimals, fractions, and percents.
    1.2 Perform arithmetic operations on approximate numbers and express the results in the proper accuracy or precision format.
    1.3 Make reductions (changes) to units of measurement within the customary system and reductions to units of measurement within the metric system.
    1.4 Make conversions between the customary and metric systems of measurement.
    1.5 Apply the algebra of dimensional analysis to geometric problem solving.
    1.6 Express measurements as a ratio in proper form.

2. Operations on Real Numbers
    2.1 Review evaluating given expressions and formulas by applying the correct priority of operations.

3. Equation Solving Techniques
    3.1 Review solving linear equations in one variable.
    3.2 Review solving literal equations and formulas for a single variable.
    3.3 Review setting up and solving proportions.
    3.4 Solve problems involving direct, inverse, and/or joint variation.
    3.5 Review solving quadratic equations by factoring.

4. Exponents and Radicals
    4.1 Review simplifying exponential expressions with integer exponents.
    4.2 Convert numbers from decimal notation to scientific notation and vice versa.
    4.3 Perform arithmetic operations using scientific notation.
    4.4 Review simplifying square root radical expressions.
    4.5 Simplify higher root radical expressions.

5. Polynomials
    5.1 Review adding and subtracting polynomials.
    5.2 Multiply polynomials.

6. Factoring
    6.1 Review the following factoring techniques: Factor a monomial GCF from a polynomial, factor the difference of two squares, and factor trinomials of the form $ax^2 + bx + c$.

7. Rational Expressions
    7.1 Review simplifying rational expressions.
    7.2 Review multiplying and dividing rational expressions.
    7.3 Review adding and subtracting rational expressions with like denominators.

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8. The Cartesian Coordinate System
    8.1 Review graphing linear equations in two variables by plotting points.
    8.2 Review slope and its relationship to horizontal, vertical, parallel and perpendicular lines.
    8.3 Review graphing linear equations using the slope and y-intercept.
    8.4 Graph quadratic functions of the form $y = ax^2 + bx + c$ by plotting points.

9. Geometry
    9.1 Review the definitions of plane figures: triangle, parallelogram, square, rectangle, trapezoid and circle.
    9.2 Review area and perimeter of triangles, squares and rectangles.
    9.3 Review radius, diameter, circumference and area of circles.
    9.4 Find the volume of a rectangular solid, sphere, prism and cylinder.
    9.5 Review the difference between a line, line segment and ray.
    9.6 Review the definitions of types of angles: acute, obtuse, right, straight, complementary, supplementary, vertical, corresponding, interior and exterior.
    9.7 Review finding measures of angles when two parallel lines are cut by a transversal by using alternate interior angles, alternate exterior angles and corresponding angles.

10. Trigonometry
    10.1 Review the use of the Pythagorean Theorem.
    10.2 State the sine, cosine and tangent ratios in terms of opposite side, adjacent side and hypotenuse of a right triangle.
    10.3 Use special triangles (30°-60°-90°, 45°-45°-90°) to find sine, cosine, and tangent ratios of special angles.
    10.4 Find any angle or side of a right triangle given one acute angle and one side, or two sides.
    10.5 Solve applications involving right triangles.