



MTH 152 – Survey of Mathematics for Technicians

(approved 2/26/2021)

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 and trigonometry to solve practical problems from various technologies. A comprehensive final exam testing the degree of mastery of the following course objectives is required.

1. Approximate Numbers and Measurements
 - 1.1 Perform arithmetic operations on approximate numbers and use significant digit rules to express the results in the proper accuracy or precision format.
 - 1.2 Review making reductions (changes) to units of measurement within the customary system and reductions to units of measurement within the metric system.
 - 1.3 Review making conversions between the customary and metric systems of measurement.
 - 1.4 Express measurements as a ratio in simplified form.
2. Geometry
 - 2.1 Define the types of angles: acute, obtuse, right, straight, complementary, supplementary, vertical, corresponding, interior and exterior.
 - 2.2 Find the measures of angles when two parallel lines are cut by a transversal by using alternate interior angles, alternate exterior angles and corresponding angles.
 - 2.3 Review the definitions of plane figures: triangle, parallelogram, square, rectangle, trapezoid and circle.
 - 2.4 Review area and perimeter of triangles, squares and rectangles.
 - 2.5 Review radius, diameter, circumference and area of circles.
 - 2.6 Find measurements of irregular two-dimensional shapes formed by joining triangles, squares, rectangles or circular sections.
 - 2.7 Review finding the volume of a rectangular solid, sphere, prism and cylinder.
3. Exponents and Scientific Notation
 - 3.1 Simplify exponential expressions with integer exponents.
 - 3.2 Convert numbers from decimal notation to scientific notation and vice versa.
 - 3.3 Perform arithmetic operations using scientific notation.
4. Equation Solving Techniques
 - 4.1 Review solving linear equations in one variable.
 - 4.2 Solve literal equations and formulas for a specified variable.
 - 4.3 Solve applications of linear equations in one variable.
 - 4.4 Solve systems of two linear equations in two variables algebraically.
 - 4.5 Solve applications of systems of two linear equations in two variables.
 - 4.6 Set up and solve proportions.
 - 4.7 Solve problems involving direct, inverse, and/or joint variation.
 - 4.8 Solve quadratic equations by using the quadratic formula.

5. Operations on Complex Numbers
 - 5.1 Define the imaginary unit, and change imaginary numbers to imaginary form.
 - 5.2 Perform basic arithmetic operations on complex numbers given in rectangular form.
6. Functions
 - 6.1 Define a function.
 - 6.2 Evaluate functions expressed in function notation for a specified input value.
 - 6.3 Find the domain and range of a function from its graph.
7. The Cartesian Coordinate System
 - 7.1 Graph linear equations in two variables by plotting points.
 - 7.2 Graph quadratic equations of the form $y = ax^2 + bx + c$ by plotting points.
 - 7.3 Graph functions defined by a table of data.
8. Trigonometry and Applied Trigonometry
 - 8.1 Convert an angle measurement in radians or degrees to an equivalent measurement.
 - 8.2 State the six trigonometric ratios in terms of opposite side, adjacent side and hypotenuse of a right triangle.
 - 8.3 Review the use of the Pythagorean Theorem.
 - 8.4 Find any angle or side of a right triangle given one acute angle and one side, or two sides.
 - 8.5 Solve right triangles and applications involving right triangles.
 - 8.6 Evaluate trigonometric functions for any angle.
 - 8.7 Solve applications involving radian measure including arc length and area of a sector.
 - 8.8 Represent vectors, vector sums, and scalar multiples of two-dimensional vectors graphically.
 - 8.9 Express a two-dimensional vector in component form given its magnitude and direction angle, and find the magnitude and direction angle of a vector given its components.
 - 8.10 Obtain the sum of two or more two-dimensional vectors using components.
 - 8.11 Solve application problems requiring the addition of two-dimensional vectors.
 - 8.12 Use the inverse sine, inverse cosine, or inverse tangent function to obtain the measure of an angle in a right triangle or oblique triangle.
 - 8.13 Apply the Law of Sines and the Law of Cosines to solve oblique triangles and applications involving oblique triangles.
 - 8.14 Determine the amplitude, period, frequency, and displacement and sketch the graphs of the sine and cosine functions.