

SUFFOLK COUNTY COMMUNITY COLLEGE
COLLEGE-WIDE COURSE SYLLABUS
MAT112

I. COURSE TITLE:

Technical Mathematics for College Students

II. CATALOG DESCRIPTION:

Review of elementary algebra, properties of exponents and radicals, scientific notation, use of a calculator, linear expressions, trigonometric expressions and right triangle trigonometry, solving linear and some restricted quadratic equations and systems of linear equations in two variables, vectors and some basic operations on vectors.

Note: Fulfills SUNY General Education knowledge and skill area in Mathematics (and Quantitative Reasoning). Emphasis will be on applied problems from technical disciplines.

Prerequisite: MAT007 or equivalent. Offered on: A-E-G/ 4 cr. hrs.

III. COURSE GOALS:

- A. Weights and Measurement Arithmetic Calculations
- B. Geometric Calculations and Analysis Techniques
- C. Analytic Algebra Techniques
- D. Analytic Trigonometry
- E. Analysis with Vectors

IV. COURSE OBJECTIVES:

Upon successful completion of this course, students will be able to:

1. Calculate with all types of measurements and their associated units, including the conversion of units;
2. Find and estimate the geometric quantities of length, area, volume and angles;
3. Perform basic algebraic analysis including graphical analysis of relations with two variables;
4. Evaluate and work with formulas in technology;
5. Understand and perform basic calculations using trigonometric expressions;
6. Understand and perform basic calculations with vectors;
7. Represent mathematical information in technology symbolically, visually, numerically, or verbally as appropriate;

8. Interpret and draw inferences from appropriate mathematical models such as formulas, graphs, tables and charts;
9. Employ quantitative methods such as arithmetic, algebra, or geometry to solve problems in technology.

V. Topics Outline with Timeline

Topics	Approximate Time (including examinations)
<p>A. <u>Weights and Measurement Arithmetic Calculations</u></p> <ol style="list-style-type: none"> 1. Measurements of lengths requiring fractions and decimals including both metric and US Customary units 2. Conversion of units to different scales and between metric and US Customary units using dimensional analysis 3. Arithmetic with fractions and decimals including order of operations of problem with units, both with and without a scientific calculator 4. Exponents and rules of exponents including negative exponents 5. Scientific notation with and without a scientific calculator 6. Square root calculations with and without a scientific calculator 7. Formula evaluations including units of force. 	2 ½ weeks
<p>B. <u>Geometric Calculations and Analysis Techniques</u></p> <ol style="list-style-type: none"> 1. Find exact and estimated areas of common geometric objects with units, both with and without a scientific calculator <ol style="list-style-type: none"> a. Perimeter of square, rectangle, triangle, and circle b. Area of a square, rectangle, triangle (including Heron's formula), circle, and complex composite shapes all with units c. Volume of a cube, rectangular solid, cylinder with units and connection between solid and liquid-volume 2. Finding lengths of the sides of triangular objects with units using the Pythagorean Theorem and a scientific calculator 3. Angle definition and calculations including special angles in technological disciplines, such as <ol style="list-style-type: none"> a. drive line and suspension angles in Automotive b. roof pitch and fan blade angles in HVAC 	3 ½ weeks

<p>C. <u>Analytic Algebra Techniques</u></p> <ol style="list-style-type: none"> 1. Ratios, rates and proportions (include A:B notation) 2. Percentages and applications with and without a scientific calculator 3. Solve linear equations in a single variable 4. Solve quadratic equations of the form $ax^2 - c = 0$ using the square root property 5. Solve formulas for a different variable 6. Direct and inverse variation definitions and applications 7. Graph lines as the solution set of a linear equation in two variables 8. Independent and dependent variables 9. Interpretation of tables, charts and graphs, including <ol style="list-style-type: none"> a. pressure enthalpy, and psychrometric charts for HVAC b. valve-lift, and air-fuel ratio charts and graphs for Automotive 10. Solve a system of two linear equations in two variables using substitution 	4 weeks
<p>D. <u>Analytic Trigonometry</u></p> <ol style="list-style-type: none"> 1. Degree, radian, and degree-minute-second (DMS) angular measures and conversion between each 2. Definition of the sine, cosine, tangent and cotangent, using a right triangle 3. Solving right triangle trigonometric problems and applications 4. Pythagorean identity for sine and cosine expressions 	2 ½ weeks
<p>E. <u>Analysis with Vectors</u></p> <ol style="list-style-type: none"> 1. Geometric definition of a vector 2. Quantities that need a vector (force and velocity) 3. Algebraic representation of vectors in both rectangular and polar form 4. Finding components of a vector 5. Convert between rectangular and polar form of vectors 6. Vector arithmetic (only using geometric definition) 	2 weeks
<p>F. <u>Review and Cumulative Final Examination</u></p>	½ week

VI. Evaluation of Student Performance:

To be determined by the instructor.

VII. Programs that require this course:

Automotive Service Specialist/AAS (required)

Baking and Pastry Arts/AAS (required)
Heating, Ventilation, Air Conditioning and Refrigeration Technology/AAS (required)
Heating, Ventilation, Air Conditioning and Refrigeration Technology/Certificate
(required)
Toyota T-EN Automotive Service/AAS (required)

VIII. Courses that require this course as a prerequisite:

None

IX. Supporting Information:

Mathematics tutoring services, as well as video and computer aids, are provided for all students through the Math Learning Center (Ammerman Campus, Huntington Library, room H-104), the Academic Tutoring Center (Grant Campus, Learning Resource Center, room LRC-149), and the Academic Support Center (Eastern Campus, Montaukett Learning Resource Center, room 224).