

MAT 116 TECHNICAL MATHEMATICS (3 credit hours)[KCTCS Course Information](#)

Official Course Description	Includes some mathematical concepts from algebra, geometry, and trigonometry and applications relevant to these topics. Includes unit conversions, variation, measurement of geometric figures, vectors, and solving right and oblique triangles using trigonometry. Emphasizes applications in the various technologies. Prerequisite: MAT 062 or MAT 065 or equivalent as determined by KCTCS placement examination.
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OFFICIAL COURSE COMPETENCIES/OBJECTIVES

Upon completion of this course, the student can:

1. Perform conversions using U. S. customary and SI (metric) measures.
2. Apply basic plane geometric principles of lines, angles, triangles and other polygons, circles and arcs, congruency and similarity.
3. Calculate surface area and volume of basic geometric solids.
4. Solve problems involving significant digits and accuracy and precision of numbers.
5. Solve problems involving ratio, proportion, direct, inverse and joint variation.
6. Perform conversions between coordinate systems.
7. Apply fundamentals of trigonometric functions and co-functions to right triangles.
8. Apply the law of sines and the law of cosines to oblique triangles.
9. Solve problems involving compound angles.
10. Identify the vector concept, the components of vectors and add vectors.
11. Use a scientific calculator.
12. Solve application problems involving the above competencies.

OFFICIAL COURSE OUTLINE

- I. Measurement
 - A. Precision
 - B. Accuracy
 - C. Significant Digits
 - D. Conversion US customary – Metric
- II. Variation
 - A. Ratio
 - B. Proportion
 - C. Direct Variation
 - D. Inverse Variation
 - E. Joint Variation
- III. Geometry
 - A. Lines
 - B. Angles
 - C. Triangles and Other Polygons
 - D. Circles and Arcs
 - E. Congruency and Similarity
 - F. Solids – Surface and Volume
- IV. Trigonometry
 - A. Trigonometric Functions for Right Triangles
 - B. Law of Sines
 - C. Law of Cosines
 - D. Compound Angles
 - E. Conversions between Coordinate Systems
 - F. Vector Concepts, Components and Addition

GENERAL EDUCATION COMPETENCIES

- A. Knowledge of human cultures and the physical and natural worlds through study in the sciences and mathematics, social sciences, humanities, histories, languages, and the arts.
- B. Intellectual and practical skills, including
 - inquiry and analysis
 - critical and creative thinking
 - written and oral communication
 - quantitative literacy
 - information literacy
 - teamwork and problem solving
- C. Personal and social responsibility, including
 - civic knowledge and engagement (local and global)
 - intercultural knowledge and competence
 - ethical reasoning and action
 - foundations and skills for lifelong learning
- D. Integrative and applied learning, including synthesis and advanced accomplishment across general and specialized skills.

STUDENT LEARNING OUTCOMES FOR QUANTITATIVE REASONING Approved Spring 2018

Upon completion of MAT 116, the student can:

1. Interpret information presented in mathematical and/or statistical forms by (Gen Ed Comp B):
 - Perform conversions using U. S. customary and SI (metric) measures.
 - Identify the vector concept, the components of vectors and add vectors.
2. Illustrate and communicate mathematical and/or statistical information symbolically, visually, and/or numerically by (Gen Ed Comp A, B, C):
 - Calculate surface area and volume of basic geometric solids.
 - Solve problems involving significant digits and accuracy and precision of numbers.
 - Solve problems involving compound angles.
3. Determine when computations are needed and execute the appropriate computations by (Gen Ed Comp A, B):
 - Perform conversions between coordinate systems.
4. Apply an appropriate model to the problem to be solved by (Gen Ed Comp A, B, C):
 - Apply basic plane geometric principles of lines, angles, triangles and other polygons, circles and arcs, congruency and similarity.
 - Apply fundamentals of trigonometric functions and co-functions to right triangles.
 - Apply the law of sines and the law of cosines to oblique triangles.
5. Make inferences, evaluate assumptions, and assess limitations in estimation modeling and/or statistical analysis by (Gen Ed Comp A, D):
 - Solve application problems involving the course competencies.

LEARNING RESOURCES

- ✓ Tan, S.T. (2004). *Applied Mathematics (3rd ed.)*. Belmont, CA: Wadsworth-Thomson Learning.
- ✓ Smith, Karl J. (2003). *Mathematics Its Power and Utility (7th ed.)*. Pacific Grove, CA: Brooks/Cole-Thomson Learning.
- ✓ Smith (2002). *Technical Mathematics (4th ed.)*. Albany, NY: Delmar/Thomson Learning.
- ✓ Kramer, A. D. (2002). *Mathematics for Electricity & Electronics (2nd ed.)*. Albany, NY: Delmar-Thompson Learning.