

JEFFERSON COLLEGE
COURSE SYLLABUS

MTH121
TECHNICAL MATHEMATICS I

3 Credit Hours

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MTH121 Technical Math I

I. CATALOGUE DESCRIPTION

- A. Prerequisite: COMPASS algebra score of at least 42, ACT math score of 18 or higher, or MTH002 with a grade of “C” or better. Pre-/corequisite: reading proficiency
- B. 3 semester credit hours
- C. Technical Mathematics is a study of selected topics from algebra and trigonometry with technical applications. Technical Math I is applicable only to the Associate of Applied Science Degree. (D)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Note: Each of the following learning outcomes will be measured on at least one in-class exam, but instructors are encouraged to assess them with additional measures, including homework, quizzes, and/or projects.

Expected Learning Outcomes	Assessment Measures
Perform basic operations on numbers and algebraic expressions, and use these operations in solving applications and literal equations	Class discussion/practice, homework, quizzes/tests
Identify the relationships between parts of basic geometric figures, and use basic formulas to find areas of regular and irregular plane figures and surface areas of solid figures	Class discussion/practice, homework, quizzes/tests
Use trigonometric ratios, the Law of Sines, and Law of Cosines to solve applications involving right triangles and general triangles	Class discussion/practice, homework, quizzes/tests
Give the value of the trigonometric functions for (all) angles given in degrees and radians	Class discussion/practice, homework, quizzes/tests
Use vectors and vector addition to solve applied problems involving forces	Class discussion/practice, homework, quizzes/tests
Graph modified trigonometric functions and use them to solve applications involving periodic phenomena	Class discussion/practice, homework, quizzes/tests
Solve application involving variation	Class discussion/practice, homework, quizzes/tests

Expected Learning Outcomes	Assessment Measures
Identify arithmetic and geometric sequences and express them algebraically	Class discussion/practice, homework, quizzes/tests
Use trigonometric identities, formulas and inverses to simplify expressions and solve trigonometric equations	Class discussion/practice, homework, quizzes/tests
Define conic sections analytically in rectangular and polar coordinates, and perform translation of axes and rotation of axes on them	Class discussion/practice, homework, quizzes/tests

III. OUTLINE OF TOPICS

A. Basic Algebraic Operations (Review)

1. Numbers
2. Fundamental Operations of Algebra
3. Calculators and Approximate Numbers
4. Exponents
5. Scientific Notation
6. Roots and Radicals
7. Addition and Subtraction of Algebraic Expressions
8. Multiplication of Algebraic Expressions
9. Division of Algebraic Expressions
10. Solving Equations
11. Formulas and Literal Equations
12. Applied Word Problems

B. Geometry

1. Lines and Angles
2. Triangles
3. Quadrilaterals
4. Circles
5. Measurement of Irregular Areas
6. Solid Geometric Figures

C. The Trigonometric Functions

1. Angles
2. Defining the Trigonometric Functions
3. Values of the Trigonometric Functions
4. The Right Triangle
5. Applications of Right Triangles

- D. Systems of Linear Equations
 - 1. Linear Equations
 - 2. Graphs of Linear Functions
 - 3. Solving 2by2 Systems Graphically
 - 4. Solving 2by2 Systems Algebraically
 - 5. Solving 2by2 Systems by Determinants
 - 6. Solving 3by3 Systems Algebraically
 - 7. Solving 3by3 Systems by Determinants

- E. Trigonometric Functions of Any Angle
 - 1. Signs of the Trigonometric Functions
 - 2. Trigonometric Functions of Any Angle
 - 3. Radians
 - 4. Applications of Radian Measure

- F. Vectors and Oblique Triangles
 - 1. Introduction to Vectors
 - 2. Components of Vectors
 - 3. Vector Addition by Components
 - 4. Applications of Vectors
 - 5. Oblique Triangles, the Law of Sines
 - 6. The Law of Cosines

- G. Graphs of the Trigonometric Functions
 - 1. Graphs of $y = a \sin x$ and $y = a \cos x$
 - 2. Graphs of $y = a \sin bx$ and $y = a \cos bx$
 - 3. Graphs of $y = a \sin (bx + c)$ and $y = a \cos (bx + c)$
 - 4. Applications of the Trigonometric Graphs

- H. Variation
 - 1. Ratio and Proportion
 - 2. Variation

- I. Sequences and the Binomial Theorem
 - 1. Arithmetic Sequences
 - 2. Geometric Sequences

- J. Additional Topics in Trigonometry
 - 1. Fundamental Trigonometric Identities
 - 2. The Sum and Difference Formulas
 - 3. Double-Angle Formulas
 - 4. Half-Angle Formulas
 - 5. Solving Trigonometric Equations
 - 6. The Inverse Trigonometric Functions

- K. Plane Analytic Geometry
 - 1. Basic Definitions
 - 2. The Straight Line
 - 3. The Circle
 - 4. The Parabola
 - 5. The Ellipse
 - 6. The Hyperbola
 - 7. Translation of Axes
 - 8. Polar Coordinates
 - 9. Curves in Polar Coordinates

IV. METHODS OF INSTRUCTION

- A. Lecture and Discussion
- B. In-Class Activities
- C. Textbook Readings
- D. MyMathLab Interactive Assignments

V. REQUIRED TEXTBOOKS

- A. Washington, Basic Technical Mathematics, current edition. Boston: Pearson
- B. MyMathLab Student Access Kit. Boston: Pearson

VI. REQUIRED MATERIALS

Scientific Calculator – Texas Instruments – TI30XIIB

VII. SUPPLEMENTAL REFERENCES

- A. Available on-campus
 - 1. Math Lab (Hillsboro, Arnold, and Online)
 - 2. Peer tutoring
- B. Available online within MyMathLab
 - 1. Study plan
 - 2. Section videos
 - 3. Pearson Tutor Services (30 minutes free, additional time at cost)

VIII. METHODS OF EVALUATION

A. Tests	50%
B. Quizzes	20%
C. Homework/Attendance/Participation	10%
D. Final Exam	20%

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-797-3000, ext. 3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.