JEFFERSON COLLEGE

COURSE SYLLABUS

MTH 133
TRIGONOMETRY
3 Credit Hours

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Arts & Science Education
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MTH133 TRIGONOMETRY

I. CATALOG DESCRIPTION

Prerequisite(s): ASSET-Intermediate Algebra with score of 40 or ACT Math with score of 20 or MTH128 Intermediate Algebra with minimum grade of C
Or
COMPASS Algebra with score of 66 or COMPASS College Algebra with score of 31

Trigonometry deals with angles, trigonometric and inverse trigonometric functions, solving triangles, vectors, polar coordinates, and complex numbers. Students may not apply both MTH133 and MTH141 toward graduation. A graphing calculator is required. (F,S)

II. GENERAL COURSE OBJECTIVES

Upon completion of this course the student should be able to:

A. Demonstrate an understanding of the trigonometric ratios of a right triangle

B. Solve a right triangle given an acute angle and a side.

C. Solve applications using right triangles

D. Demonstrate an understanding of radian measure in terms of arc length and radius.

E. Convert angles between degrees measure and radian measure, exactly and approximately

F. Use a calculator to approximate the trig functions of angles.

G. Find the exact values of the trigonometric functions of; $\pi$, $\pi/2$, $\pi/3$, $\pi/4$, $\pi/6$ and their multiples.

H. Sketch the graphs of sin, cos, and tan functions.

I. Use a calculator to approximate cot$^{-1}$, sec$^{-1}$, and csc$^{-1}$ in radians.

J. Write the Pythagorean, reciprocal and quotient identities.
K. Use basic trigonometric identities (reciprocal, quotient, Pythagorean, sum, difference, cofunction, double and half-angle) to verify other identities.

L. Solve trigonometric equations.

M. Use the law of sines and law of cosines to solve triangles.

N. Find the areas of triangles using trigonometry.

O. Find a unit vector in the same direction as a given vector.

P. Find the dot product of two vectors expressed in either ordered pair form or in terms of i and j.

Q. Convert polar coordinates to rectangular coordinates and rectangular coordinates to polar coordinates.

R. Sketch graphs of polar equations.

S. Multiply and divide complex numbers in polar form.

These objectives will be assessed on the final examination.

III. COURSE OUTLINE

A. Right Triangle Ratios.

B. Trigonometric Functions.

C. Graphs of Trigonometric Functions.

D. Trigonometric Identities.

E. Inverse Trigonometric Functions and Trig Equations and Inequalities.

F. Triangles and Vectors.

G. Polar Coordinates and Complex Numbers.

IV. UNIT OUTLINE

A. Right Triangle Ratios
   1. Angles, Degrees, and Arcs
   2. Similar Triangles
   3. Trigonometric Ratios and Right Triangles
   4. Right Triangle Applications
B. Trigonometric Functions
1. Degrees and Radians
2. Linear and Angular Velocity
3. Trigonometric Functions: Unit Circle Approach
4. Additional Applications
5. Exact Values and Properties of Trigonometric Functions

C. Graphing Trigonometric Functions
1. Basic Graphs
2. Graphing \( y = k + A \sin Bx \) and \( y = k + A \cos Bx \)
3. Graphing \( y = k + A \sin(Bx + C) \) and \( y = k + A \cos(Bx + C) \)
4. Additional Applications
5. Graphing Combined Forms
6. Tangent, Cotangent, Secant, and Cosecant Functions Revisited

D. Identities
1. Fundamental Identities and their Use
2. Verifying Trigonometric Identities
3. Sum, Difference, and Cofunction Identities
4. Double-Angle and Half-Angle Identities
5. Product-Sum and Sum-Product Identities

E. Inverse Trigonometric Functions; Trigonometric Equations and Inequalities
1. Inverse Sine, Cosine, and Tangent Functions
2. Inverse Cotangent, Secant, and Cosecant Functions
3. Trigonometric Equations: An Algebraic Approach

F. Additional Topics: Triangles and Vectors
1. Law of Sines
2. Law of Cosines
3. Areas of Triangles
4. Vectors: Geometrically Defined
5. Vectors: Algebraically Defined
6. The Dot Product

G. Polar Coordinates; Complex Numbers
1. Polar and Rectangular Coordinates
2. Sketching Polar Equations
3. The Complex Plane
4. De Moivre’s Theorem and the 9th-root Theorem
V. METHOD OF INSTRUCTION

A. Lectures
B. Class Discussion
C. Textbook
D. Internet (Web Telecourse)

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION


VII. REQUIRED MATERIALS (STUDENT)

Graphics calculator

VIII. SUPPLEMENTAL REFERENCES

None

IX. METHOD OF EVALUATION (STUDENT)

A. Quizzes
B. Tests
C. Final Exam