JEFFERSON COLLEGE

COURSE SYLLABUS

MTH 141

PRECALCULUS

5 Credit Hours

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by
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MTH141 PRECALCULUS

I. CATALOG DESCRIPTION

Prerequisite: College Algebra ASSET score of 38 or higher, Math ACT score of 20 or higher, or MTH128 with a grade of “C” or better.
5 semester hours credit

Precalculus covers the College Algebra and Trigonometry topics required for the Calculus I, II, III sequence. This course will meet the mathematics requirement for the Associate of Arts degree. Students may not apply both MTH141 and MTH133 or both MTH141 and MTH134 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. To solve polynomial inequalities
B. To solve rational inequalities
C. Find the domain and range of a function.
D. Find the maximum or minimum value of a quadratic function.
E. Find the inverse of a function.
F. Find the composition of two functions and its domain
G. Graph a polynomial function, with and without a graphing utility.
H. Find all zeros of a polynomial function and their multiplicities.
I. Use the change of base formula to solve problems involving logarithm.
J. Solve exponential and logarithmic equations.
K. Convert angles from degree measure to radian measure and vice versa
L. Find trigonometric functions of standard angles like π/4, π/3, and π/6.
M. Demonstrate an understanding of the trigonometric ratios of a right triangle.
N. Use the laws of sines and cosines to solve a triangle.
O. Solve a trigonometric equation.

P. Multiply and divide complex numbers in polar form.

Q. Perform the vector operations of addition, subtraction, scalar multiplication, and dot products.

R. Solve systems of linear equations in two and three variables using various methods.

S. Perform the matrix operations of addition, subtraction, scalar multiplication, and matrix multiplication.

T. Find the inverse of a square matrix of order 2

U. Find the inverse of a square matrix of any order by using a graphing utility

V. Evaluate determinants of 2 x 2 and 3 x 3 matrices

W. Convert rectangular coordinates to polar and vice versa

X. Demonstrate an understanding of arithmetic and geometric sequences and series.

Y. Expand an expression using Binomial Theorem and to find the nth term of a Binomial expansion.

Z. Graph conic sections.

These objectives will be assessed on the final examination.

III. COURSE OUTLINE

A. Functions

B. Polynomial and Rational Functions

C. Exponential and Logarithmic Functions

D. Trigonometric Functions

E. Analytic Trigonometry

F. Systems of Equations and Inequalities.
G. Topics in Analytic Geometry

H. Sequence and Series.

IV. UNIT OUTLINE

A. Functions
   1. Functions
   2. Graphs of Functions
   3. Average Rate of Change: Increasing and Decreasing Functions
   4. Transformations of Functions
   5. Extreme Values of Functions
   6. Combining Functions
   7. One-to-One Functions and their Inverses

B. Polynomial and Rational Functions
   1. Polynomial and Rational Inequalities
   2. Polynomial Functions
   3. Dividing Polynomials
   4. Real Zeros of Polynomials
   5. Complex Numbers
   6. Complex Zeros and the Fundamental Theorem of Algebra
   7. Rational Functions

C. Exponential and Logarithmic Functions
   1. Exponential Functions
   2. Logarithmic Functions
   3. Properties of Logarithms
   4. Exponential and Logarithmic Equations
   5. Exponential Growth and Decay

D. Trigonometric Functions
   1. Angle Measure
   2. Trigonometry of Right Triangles
   3. Trigonometric Functions
   4. Solving Right Triangles
   5. Graphs of Trigonometric Functions
   6. Inverse Trigonometric Functions
   7. The Law of Sines
   8. The Law of Cosines

E. Analytic Trigonometry
   1. Trigonometric Identities
   2. Addition and Subtraction Formulas
   4. Trigonometric Equations
6. Polar form of Complex Numbers: DeMoivre’s Theorem
7. Vectors
8. Dot Product

F. Systems of Equations and Inequalities
1. Systems of Equations
2. Systems of Linear Equations in Two Variables
3. Systems of Linear Equations in Several Variables
4. Systems of Linear Equations: Matrices
5. The Algebra of Matrices
6. Inverses of Matrices and Matrix Equations
7. Determinants and Cramer’s Rule
8. Systems of Inequalities
9. Partial Fractions

G. Topics in Analytic Geometry
1. Parabolas
2. Ellipses
3. Hyperbolas
4. Shifted Conics
5. Polar Coordinates
6. Polar Equations of Conics
7. Parametric Equations

H. Sequences and Series
1. Sequences and Summation Notation
2. Arithmetic Sequences
3. Geometric Sequences
4. The Binomial Theorem

V. METHOD OF INSTRUCTION

A. Lectures

B. Class Discussion

C. Textbook

VI. REQUIRED TEXTBOOK(S) (WITH PUBLICATION INFORMATION)


VII. REQUIRED MATERIALS (STUDENT)

Graphics Calculator
VIII. SUPPLEMENTAL REFERENCES

None

IX. METHOD OF EVALUATION (STUDENT)

A. Tests

B. Final Exam