JEFFERSON COLLEGE
COURSE SYLLABUS

MTH141
PRECALCULUS
5 Credit Hours

Prepared by:
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MTH141 Precalculus

I. CATALOG DESCRIPTION

A. Prerequisite: COMPASS algebra score of at least 66 or COMPASS college algebra score of at least 31 within the past two years, ACT math score of 22 or higher within the past two years, or MTH128 with a grade of “C” or better and reading proficiency

B. 5 semester credit hours

C. 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, Su)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

<table>
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<tr>
<th>Expected Learning Outcomes</th>
<th>Assessment Measures</th>
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<tr>
<td>Students will graph with and without a calculator and will recognize and use transformations in graphing. Students will further be able to determine, the domain, range, intercepts and relative extrema of a function from the graph of a function using the calculator and without using the calculator</td>
<td>Homework</td>
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<td>Quizzes/Tests/Exams</td>
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<td>Class works</td>
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<td>Students will graph polynomial functions by using the zeros, y-intercepts and end behavior of the function. They will graph the rational functions by finding the intercepts and asymptotes. They will solve polynomial and rational function inequalities. They will verify their work by using a graphing calculator.</td>
<td>Homework</td>
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<td>Students will analyze exponential and logarithmic functions and will apply them, especially in the growth and decay models. They will solve exponential and logarithmic equations. They will solve problems using Summation notation, the Arithmetic Series and Geometric Series</td>
<td>Homework</td>
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<td>Students will solve linear and non-linear systems of equations by applying various algebraic methods and will use systems to solve application problems. They will analyze Matrices and their properties and solve linear system of linear equations using Gauss Elimination method /Gauss-Jordan Elimination Method. They will verify their work by using graphing calculators</td>
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Students will recall from memory, in a timely fashion, the exact trigonometric functions of standard (multiples of 30° and 45°) angles given in degree and radian measure. They will use appropriate identities to find the exact trigonometric functions of non-standard angles.

Students will solve right triangles using trigonometric ratios and oblique triangles using the Law of Sine and Law of Cosines.

Students will solve linear and quadratic trigonometric equations and graph trigonometric functions that are shifted horizontally and vertically, with modified, amplitude, and period, determine equations of such graphs.

Students will convert rectangular coordinates into polar coordinates, and vice versa. They will analyze and draw polar graphs. They will convert complex numbers from rectangular to polar form and vice versa. They will use DeMoivre’s theorem to find the powers and roots of complex numbers.

Students will use the concepts of vectors (sum and dot products) to solve problems.

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III. OUTLINE OF TOPICS

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
3. Double-angle, half-angle, and product-sum formulas
5. Trigonometric equations
6. Polar form of complex numbers: DeMoivre’s Theorem
7. Vectors
8. Dot product

F. Systems of Equations
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. Sequences and Series
1. Sequences and summation notation
2. Arithmetic sequences
3. Geometric sequences
4. The binomial theorem

IV. METHOD OF INSTRUCTION

A. Lecture
B. Class Discussion
C. Textbook
V. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION


VI. REQUIRED MATERIALS (STUDENT)

Graphing calculator (TI 83 /83 Plus)
Symbolic Manipulators are not permitted

VII. SUPPLEMENTAL REFERENCES

Student Solution Manual

VIII. METHOD OF EVALUATION (STUDENT)

A. Homework, 10-20%
   Students will submit homework in MyMathLab. Additional problems may also be assigned

B. Classwork & Projects, 0-20%
   Additional worksheets and projects may be assigned at the discretion of the instructor to reinforce various concepts

C. Quizzes, 0-20%
   Both in-class and online quizzes may be used to evaluate mastery of concepts

D. Tests, 30-60%
   There will be a minimum five unit tests, each covering no more than 2 chapters of material. These exams may be administered on paper or online

E. Comprehensive final examination, 15-25%
   All students will be required to take a comprehensive final exam

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169, or 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

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.