

SUFFOLK COUNTY COMMUNITY COLLEGE
COLLEGE-WIDE COURSE SYLLABUS
MAT126

I. COURSE TITLE:

Precalculus Mathematics

II. CATALOG DESCRIPTION:

For students with strong mathematics backgrounds planning to enter calculus sequence. Topics include polynomial, rational, trigonometric, exponential and logarithmic functions; conic sections; translation of axes; linear and nonlinear systems; trigonometric laws and formulas, and applications; DeMoivre's Theorem and complex numbers; polar and parametric equations; and partial fractions.

Notes: (1) Credit given for MAT124 or MAT126, but not both. Credit given for MAT125 or MAT126, but not both. Successful completion of both MAT124 and MAT125 is equivalent to MAT126 completion. (2) Fulfills SUNY-GE Mathematics. (5 contact hrs.) Prerequisite: 80 or higher on the high school Algebra II Regents Exam. Offered on: A-E-G / 4 cr. hrs.

III. COURSE GOALS:

- A. Introduce the concept of a function, including the algebra and geometry of functions.
- B. Expose students to a wide variety of elementary functions.
- C. Develop methods of trigonometry, geometry and analytic geometry needed in calculus and physics.
- D. This course satisfies the SUNY general education requirement for mathematics.

IV. COURSE OBJECTIVES:

Upon successful completion of this course, students will be able to:

1. Demonstrate an understanding of a mathematical function including such ideas as the range and domain of functions, symmetric functions, composite functions, and inverse functions;
2. Sketch graphs of quadratic functions and understand the real and complex zeros of such functions;
3. Comprehend the significance of the fundamental theorem of algebra and be able to solve polynomial equations completely by finding the roots;
4. Sketch the graph of polynomial functions;
5. Sketch the graph of rational functions;
6. Sketch the graph of exponential and logarithmic functions;
7. Solve exponential and logarithmic equations;
8. Understand the trigonometric functions, their graphs, and their inverses;
9. Verify trigonometric identities;
10. Solve trigonometric equations and the general triangle, and find the area of a triangle;
11. Write and do basic computations with complex numbers in both rectangular and trigonometric form, including the use of DeMoivre's Theorem and the nth root theorem;

12. Analyze, compare, and graph polar functions, conic sections, and parametric equations;
13. Solve problems involving both linear and non-linear systems of equations and inequalities;
14. Express and analyze both arithmetic and geometric sequences and series (optional);
15. Use the principle of mathematical induction to prove identities involving summations, including the binomial theorem (optional);
16. Use a graphing calculator to perform computations and to graph a variety of functions. TI-83, TI-83 Plus, TI-84, TI-84 Plus calculators permitted only. No Computer Algebra System (CAS) enabled calculators such as TI-89 or TI-Nspire permitted.

V. Topics Outline with Timeline

Topics	Approximate Time (Including Examinations)
A. <u>Quick Review of Algebra and Graphing</u>	1 week
B. <u>Functions</u> <ol style="list-style-type: none"> 1. domain, range, intercepts 2. arithmetic operations and composition 3. graphs 4. inverses 5. special functions: absolute value, split domain, greatest 6. integer, etc. 7. even and odd functions, symmetry, translations 	1 ½ weeks
C. <u>Polynomial and Rational Functions</u> <ol style="list-style-type: none"> 1. zeros of polynomials and the fundamental theorem of algebra 2. graphs of polynomial functions 3. asymptotes and graphs of rational functions 	2 weeks
D. <u>Exponential and Logarithmic Functions</u> <ol style="list-style-type: none"> 1. domain and range 2. inverse relationship; properties 3. graphs with translations 4. applications, including compound interest, growth and decay 	2 weeks
E. <u>Trigonometric Functions</u> <ol style="list-style-type: none"> 1. domain, range and graphs of the primitive and reciprocal functions 2. amplitude, period, frequency, and phase shift 3. Pythagorean theorem, sum and difference formulas 4. double angle and half angle formulas 5. applications 6. domain, range and graphs of inverse trigonometric 	3 ½ weeks

functions 7. solving trigonometric equations	
F. <u>Applications of Trigonometry</u> 1. laws of sines and cosines 2. solving the general triangle 3. the area of a triangle 4. vectors 5. complex numbers – rectangular and trigonometric form 6. DeMoivre’s Theorem and the n^{th} root theorem	3 weeks
G. <u>Polar and Parametric Equations</u> 1. polar coordinate system 2. graphs of polar functions 3. parametric equations and their graphs	
H. <u>Conic Sections</u> 1. standard and general forms of circle, parabola, ellipse, hyperbola 2. geometric properties, (foci, directrix, focal length, eccentricity.) 3. graphs	1 week
I. <u>Systems of Equations and Inequalities</u> 1. solution by graphing 2. Gaussian elimination and augmented matrices 3. partial fractions 4. systems of non-linear equations 5. systems of inequalities	1 week
J. <u>Some Special Topics (optional)</u> 1. mathematical induction 2. binomial theorem 3. arithmetic and geometric sequences and series	

VI. Evaluation of Student Performance:

To be determined by the instructor

VII. Programs that require this course:

None

VIII. Courses that require this course as a prerequisite:

MAT141

IX. Supporting Information:

Mathematics tutoring services, as well as video and computer aids, are provided for all students through the Math Learning Center (Ammerman Campus, Riverhead 235), the Center for Academic Excellence (Grant Campus, Health, Sports and Education Center 129), and the Academic Skills Center (Eastern Campus, Orient 213).