

Montgomery County Community College  
 MAT 161  
 Precalculus I  
 4-4-0

**COURSE DESCRIPTION:**

A comprehensive precalculus course which extends the material taught in MAT 100. Additional topics include: quadratic and absolute value, inequalities, binomial theorem, sigma notation, conic sections, theory of equations and complex numbers. A graphing calculator is required for class, homework, and testing. Classroom instruction will be presented using a TI-84 Plus.

**REQUISITE(S):**

*Previous Course Requirements*

- \* MAT 100 Intermediate Algebra with a minimum grade of "C"

*Concurrent Course Requirements*

None

**COURSE COMMENTS**

- \* Quantitative Reasoning, Algebra, and Statistics Accuplacer Test Score of 251 or higher or an Advanced Algebra and Functions Accuplacer Test Score of 237-275.

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Graph linear, quadratic, and other algebraic functions with and without the use of a graphics calculator.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
2. Use rigid and nonrigid transformations to graph functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
3. Compute combinations and compositions of functions.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
4. Determine when an inverse function exists and how to find the equation of the inverse function.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
5. Solve a variety of equations, both algebraically and graphically.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
6. Generate complex numbers and demonstrate their role in the search for zeros of a polynomial.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
7. Apply knowledge to all areas of conic sections.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
8. Write efficiently in summation notation and be able to interpret statements in summation notation.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
9. Expand Binomials via the Binomial Theorem.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects
10. Solve systems of equations with two or three variables and apply this skill to a variety of real-world problems.	Lectures Small Group Discussions and/or Projects The Use of TI 84 Graphics Calculator Homework Quizzes	Exams Quizzes Homework Projects

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

#### SEQUENCE OF TOPICS:

1. Real Numbers, Exponents and Radicals
2. Polynomials and Factoring
3. Rational Expressions
4. Graphical Representation of Data; the Cartesian Plan
5. Graphs of Equations
6. Lines in the Plane
7. Functions; Graphs of Functions
8. Shifting Graphs
9. Reflecting, and Stretching Graphs
10. Combinations of Functions
11. Inverse Functions
12. Linear Equations and Problem Solving
13. Solving Equations Graphically
14. Complex Numbers
15. Solving Quadratic Equations Algebraically
16. Solving Other Types of Equations Algebraically
17. Solving Inequalities Algebraically and Graphically
18. Quadratic Functions
19. Polynomial Functions of Higher Degree
20. Real Zeros of Polynomial Functions
21. The Fundamental Theorem of Algebra
22. Rational Functions and Asymptotes

23. Graphs of Rational Functions
24. Circles and Parabolas
25. Ellipses; Hyperbolas
26. Sequences and Series
27. The Binomial Theorem
28. Solving Systems of Equations
29. Systems of Linear Equations in Two Variables
30. Multivariate Linear Systems
31. The Inverse of a Square Matrix (with calculator)

LEARNING MATERIALS:

Textbook:

Larson. (2017). *Precalculus: Real Mathematics, Real People* (7<sup>th</sup> ed.). Cengage.

Required Materials:

TI-84+ Graphing Calculator. If a student has a TI-83+, they do not need to buy a TI-84+.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by: Aileen Conway and Roseanne Hofmann	Date: 4/1998
Revised by: Fay Sewell	Date: 8/2000
Revised by: Fay Sewell	Date: 3/2001
Revised by: Aileen Conway	Date: 5/2004
Revised by: Mark McFadden	Date: 5/2007
VPAA/Provost Compliance Verification: Dr. John C. Flynn, Jr.	Date: 9/11/2009
Revised by: Marion Graziano/Debbie Dalrymple	Date: 8/1/2017
VPAA/Provost or designee Compliance Verification:	Date: 8/24/2017



*This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.*