



# Precalculus - Math 2412.021

## Course Syllabus: Fall 2019

“Northeast Texas Community College exists to provide responsible, exemplary learning opportunities.”

**Dr. Leah Reagan**  
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Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Online
	10:30 – 11:00 2:30 – 4:30	10:30 – 11:00 1:30 – 4:30	10:30 – 11:00 2:30 – 4:30	10:30 – 11:00 2:30 – 3:30		Professor checks emails several times daily.

*The information contained in this syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.*

**Catalog Course Description (include prerequisites):** Four credit hours. This is a standard first course in functional analysis with algebra, geometry, and geometric interpretations. Topics include graphs, inverse functions, polynomial functions, rational and irrational functions, exponential and logarithmic functions, trigonometric functions, inverse trigonometric functions, Law of Sines, Law of Cosines, and analytic geometry. Prerequisite: Math 1314 or equivalent. Four hours of class each week (Fall, Spring, Summer)

If you have any questions concerning Exclusive Access, please reach out to the bookstore at [ntaylor@ntcc.edu](mailto:ntaylor@ntcc.edu) or email [help@redshelf.com](mailto:help@redshelf.com).

### Required Textbook:

Sullivan / Sullivan, Precalculus: Concepts Through Functions, A Right Triangle Approach to Trigonometry, 4th Edition, Upper Saddle River, NJ. (ask for the loose-leaf version (cheaper) – pick up in the bookstore). You will need to purchase a 3 ring binder to put the loose-leaf book into.

You'll also need: 0-321-19991-X PEARSON / DIGITAL TEXT W/MYMATH LAB  
(This part is automatically built into your Blackboard account when you register.)

To access your course materials, click on the Course Materials Access link within the Start Here folder on Blackboard

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### Recommended Reading(s):

None

## **Student Learning Outcomes:**

Upon successful completion of this course, students will

- 2412.1 Recognize and apply algebraic and transcendental functions and to solve related equations both algebraically and graphically.
- 2412.2 Identify intervals of increasing, decreasing, or constant; estimate relative maxima and minima.
- 2412.3 Sketch algebraic curves with vertical, horizontal, and slant asymptotes and apply these graphs to ideas of continuity.
- 2412.4 Prove trigonometric identities.
- 2412.5 Solve right and oblique triangles.
- 2412.6 Determine the standard equation of a conic with given conditions and solve applied problems involving a conic.
- 2412.7 Solve applied problems with parametric forms, polar coordinates, vectors, and modeling.

## **Core Curriculum Purpose and Objectives:**

Through the core curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world; develop principles of personal and social responsibility for living in a diverse world; and advance intellectual and practical skills that are essential for all learning.

Courses in the foundation area of mathematics focus on quantitative literacy in logic, patterns, and relationships. In addition, these courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

## **College Student Learning Outcomes:**

### Critical Thinking Skills

- CT.1** Students will demonstrate the ability to 1) analyze complex issues, 2) synthesize information, and 3) evaluate the logic, validity, and relevance of data.

### Communication Skills

- CS.1** Students will effectively develop, interpret and express ideas through written communication.

### Empirical and Quantitative Skills

- EQS.1** Students will manipulate numerical data or observable facts by organizing and converting relevant information into mathematical or empirical form

**EQS.2** Students will analyze numerical data or observable facts by processing information with correct calculations, explicit notations, and appropriate technology.

**EQS.3** Students will draw informed conclusions from numerical data or observable facts that are accurate, complete, and relevant to the investigation.

**SCANS Skills:**

N/A

**Lectures and Discussions:**

**Course Outline:**

**Chapter 1** Functions

- 1.1 Functions (Optional)
- 1.2 The Graph of a Function (Optional)
- 1.3 Properties of Functions
- 1.4 Library of Functions; Piecewise-defined Functions
- 1.5 Graphing Techniques: Transformations
- 1.6 Mathematical Models; Building Functions (Optional)
- 1.7 Building Mathematical Models Using Variation (Optional)

**Chapter 2** Linear and Quadratic Functions

- 2.1 Properties of Linear functions and Linear Models
- 2.2 Building Linear Models from Data (Optional)
- 2.3 Quadratic Functions and Their Zeros (Optional)
- 2.4 Properties of Quadratic Functions
- 2.5 Inequalities Involving Quadratic Functions
- 2.6 Building Quadratic Models from Verbal Descriptions and from Data (Optional)
- 2.7 Complex Zeros of a Quadratic Function
- 2.8 Equations and Inequalities Involving the Absolute Value Function (Optional)

**Chapter 3** Polynomial and Rational Functions

- 3.1 Polynomial Functions and Models
- 3.2 Properties of Rational Functions
- 3.3 The Graph of a Rational Function
- 3.4 Polynomial and Rational Inequalities (Optional)
- 3.5 The Real Zeros of a Polynomial Functions (Optional)
- 3.6 Complex Zeros; Fundamental Theorem of Algebra

**Chapter 4** Exponential and Logarithmic Functions

- 4.1 Composite Functions (Optional)
- 4.2 One-to-One Functions; Inverse Functions
- 4.3 Exponential Functions
- 4.4 Logarithmic Functions
- 4.5 Properties of Logarithms
- 4.6 Logarithmic and Exponential Equations (Optional)

## **Chapter 5** Trigonometric Functions

- 5.1 Angles and Their Measure
- 5.2 Right Triangle Trigonometry
- 5.3 Computing the Values of Trigonometric Functions of Acute Angles
- 5.4 Trigonometric Functions of any Angle
- 5.5 Unit Circle Approach: Properties of the Trigonometric Functions
- 5.6 Graphs of the Sine and Cosine Functions
- 5.7 Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions
- 5.8 Phase Shift; Sinusoidal Curve Fitting (As time permits)

## **Chapter 6** Analytic Trigonometry

- 6.1 The Inverse Sine, Cosine, and Tangent Functions
- 6.2 The Inverse Trigonometric Functions (Continued)
- 6.3 Trigonometric Equations
- 6.4 Trigonometric Identities
- 6.5 Sum and Difference Formulas
- 6.6 Double-angle and Half-angle Formulas
- 6.7 Product-to-Sum and Sum-to-Product Formulas (Optional)

## **Chapter 7** Applications of Trigonometric Functions

- 7.1 Applications Involving Right Triangles
- 7.2 The Law of Sines
- 7.3 The Law of Cosines
- 7.4 Area of a Triangle (Optional)
- 7.5 Simple Harmonic Motion; Damped Motion; Combining Waves (Optional)

## **Chapter 8** Polar Coordinates; Vectors

- 8.1 Polar Coordinates
- 8.2 Polar Equations and Graphs
- 8.4 Vectors

## **Chapter 9** Analytic Geometry

- 9.1 Conics
- 9.2 The Parabola
- 9.3 The Ellipse
- 9.4 The Hyperbola
- 9.7 Plane Curves and Parametric Equations

### **Evaluation/Grading Policy:**

Three major 100 point examinations will be given, and together they will be worth 45% of the final grade. If an exam is missed or failed, the highest possible make-up grade is a 70 (with instructor notification prior to the exam missed).

The average of a series of homework assignments will be worth 25% of the total grade (all homework is on MyMathLab). All homework due dates are posted on MyMathLab. Homework is due on the due date...no exceptions. Quizzes over each chapter will be worth 10% of the final grade.

A comprehensive final examination will contribute 20% to the final grade.

### Tests/Exams:

3 Exams	45%
Final Exam	20%
Online Assignments (MyMathLab)	25%
Quizzes	10%

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TOTAL 100%

"A"	90%
"B"	80%
"C"	70%
"D"	60%
"F"	Below 60%

### Other Course Requirements

A graphing calculator is required for this course.

### Student Responsibilities/Expectations:

Attendance: Students are expected to attend every class. If a student has to miss class, he/she must contact the instructor prior to missing. Class attendance is vital to being successful in this class. Also, students must be self-motivated to keep up with the due dates, turn in assignments ON TIME, and take Exams as scheduled.

Students are expected to be respectful to classmates, the Professor and themselves. Students will be warned when using a phone inappropriately. A student will be removed from class if any disruption continues.

The college's official means of communication is via your campus email address. I will use your campus email address and Remind 101 to communicate with you outside of class. Make sure you keep your campus email cleaned out and below the limit so you can receive important messages.

### APPROPRIATE CLASSROOM BEHAVIOR:

Students are expected to conduct themselves in a mature and respectful manner toward the Professor as well as other students. An orderly and cooperative classroom environment is essential for optimum learning to take place. In order to maintain an environment in which learning can take place the following behaviors are expected to be observed:

- Turn off cell phones or set them on silent.
- Pay attention during instruction. You should not be working on homework, texting, or social networking during instruction. These are three of my pet peeves.
- Out of respect for the Professor and others in the class, avoid side conversations during instruction.
- Use class time wisely.
- Above all, be respectful to each other and practice the "Golden Rule."

The instructor reserves the right to administratively drop a student who goes beyond two weeks in turning in online assignments unless the instructor is notified and given a valid reason for late assignments.

**NTCC Academic Honesty Statement:**

"Students are expected to complete course work in an honest manner, using their intellects and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. NTCC upholds the highest standards of academic integrity. This course will follow the NTCC Academic Honesty policy stated in the Student Handbook."

**Academic Ethics**

The college expects all students to engage in academic pursuits in a manner that is beyond reproach. Students are expected to maintain complete honesty and integrity in their academic pursuit. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. Refer to the student handbook for more information on this subject.

**ADA Statement:**

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to request accommodations. An appointment can be made with Shannin Garrett, Academic Advisor/Coordinator of Special Populations located in the College Connection. She can be reached at 903-434-8218. For more information and to obtain a copy of the Request for Accommodations, please refer to the [NTCC website - Special Populations](#).

**Family Educational Rights And Privacy Act (Ferpa):**

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered "eligible students." In essence, a parent has no legal right to obtain information concerning the child's college records without the written consent of the student. In compliance with FERPA, information classified as "directory information" may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student's name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

**Other Course Policies:**

The college's official means of communication is via your campus email address. I will use your campus email address, Blackboard, and MyMathLab to communicate with you outside of class. Make sure you keep your campus email cleaned out and below the limit so you can receive important messages.