

COLLIN COUNTY COMMUNITY COLLEGE
COURSE SYLLABUS

COURSE NUMBER: Math 2312

COURSE TITLE: Pre-Calculus

CREDIT HOURS: 3 **LECTURE HOURS:** 3 **LAB HOURS:** 1 **CLN/REC HOURS:** 0

ASSESSMENTS:

Prior to enrolling in this course, the student must demonstrate eligibility to enroll in the following:
MATH 2312.

PREREQUISITE: Math 1316

COREQUISITE: None

TEXTBOOK:

Onsite courses: Pre-Calculus with Limits, Ron Larson and Robert Hostetler, Houghton Mifflin Company, 2007.

Online courses: e-mail your professor, ngeller@cccd.edu, for textbook information.

SUPPLIES: Graphing calculator required

COURSE DESCRIPTION:

Functions and analytic geometry including rational and trigonometric functions, solving exponential, logarithmic and trigonometric equations, vectors, conics, polar coordinates, and parametric equations. Emphasis is on mathematical reasoning in preparation for calculus.

COURSE MEASURABLE LEARNING OBJECTIVES:

Upon completion of this course the students should be able to do the following:

1. Demonstrate algebraic techniques necessary for calculus.
2. Demonstrate trigonometric techniques necessary for calculus.
3. Use vectors to solve problems, both in 2 dimensions and in 3 dimensions.
4. Find partial fraction decomposition and solve nonlinear systems.
5. Analyze conic sections in both rectangular and polar coordinates.

COURSE REQUIREMENTS:

Attending lectures, completing assignments, completing required exams, and knowledge of calculator use are all required.

COURSE FORMAT:

The format will be lecture, lab and guided practice.

METHOD OF EVALUATION:

There will be a minimum of four written exams, a lab component grade, and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor's addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student's grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

ATTENDANCE POLICY:

Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to contact the instructor to obtain assignments. Please see the schedule of classes for the last day to withdraw.

Religious Holy Days: In accordance with section 51.911 of the Texas Education Code, the college will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time. A copy of the state rules and procedures regarding holy days and the form for notification of absence from each class under this provision are available from the Admissions and Records Office.

COURSE REPEAT POLICY:

All students may repeat this course only once after receiving a grade, including W. For example students who have taken this course twice have to choose a different course to take after two trials.

ADA STATEMENT:

It is the policy of Collin County Community College to provide reasonable and appropriate accommodations for individuals with documented disabilities. This College will adhere to all applicable Federal and State laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to contact the ACCESS Office (G-200) or 972.881.5898, (TDD 972.881.5950) in a timely manner if he/she desires to arrange for accommodations.

ACADEMIC ETHICS:

The college may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of material

as one's own work that is not one's own. Scholastic dishonesty may involve one or more of the following acts: cheating, plagiarism, collusion, and/or falsifying academic records.

Cheating is the willful giving or receiving of information in an unauthorized manner during an examination, illicitly obtaining examination questions in advance, using someone else's work for assignments as if it were one's own, copying computer disks or files, and any other dishonest means of attempting to fulfill the requirements of a course.

Plagiarism is the use of an author's words or ideas as if they were one's own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation. Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures or consult the CCCCD Student Handbook.

SPECIFIC REQUIREMENTS/COURSE CONTENT:

The student will be responsible for knowing all definition and statements of theorems for each section outlined in the following modules.

MODULE 1: ALGEBRA TOPICS

The student will be able to:

1. Factor expressions with rational exponents
2. Simplify complex fractions
3. Rationalize numerators
4. Find and simplify a function's difference quotient
5. Form composite functions
6. Write functions as compositions
7. Verify inverse functions
8. Find the inverse of a function
9. Use the horizontal line test to determine if a function has an inverse function
10. Use the graph of a one-to-one function to graph its inverse function
11. Find the domain and range of rational functions
12. Use arrow notation
13. Identify vertical, horizontal, and slant asymptotes
14. Graph rational functions
15. Solve quadratic and rational inequalities
16. Solve exponential and logarithmic equations

MODULE 2: TRIGONOMETRY

The student will be able to:

1. Analyze the graphs and variations of the sine, cosine, and tangent functions
2. Solve problems involving the inverse sine, cosine, and tangent functions
3. Use a calculator to evaluate inverse trig functions
4. Find exact values of composite functions with inverse trig functions
5. Use power reducing formulas

6. Find all solutions to a trigonometric equation
7. Solve equations with multiple angles
8. Solve trigonometric equations in quadratic form
9. Use factoring to separate different functions in trigonometric equations
10. Use identities to solve trigonometric equations

MODULE 3: ADDITIONAL TOPICS IN TRIGONOMETRY

The student will be able to:

1. Plot points in the polar coordinate system
2. Find multiple sets of polar coordinates of a given point
3. Convert a point or equation from polar to rectangular coordinates
4. Convert a point or equation from rectangular to polar coordinates
5. Graph polar equations
6. Use magnitude and direction to show vectors are equal
7. Visualize scalar multiplication, vector addition and subtraction as geometric vectors
8. Represent vectors in the rectangular coordinate system
9. Perform operations with vectors in terms of \mathbf{i} and \mathbf{j} , and \mathbf{i} , \mathbf{j} and \mathbf{k}
10. Find a unit vector in the direction of \mathbf{v}
11. Solve applied problems involving vectors
12. Find the dot product of two vectors
13. Find the angle between two vectors
14. Use the dot product to determine if two vectors are orthogonal
15. Find the cross product of two vectors
16. Solve problems involving applications of the cross product

MODULE 4: PARTIAL FRACTIONS AND NONLINEAR SYSTEMS

The student will be able to:

1. Find the partial fraction decomposition of a rational expression
2. Recognize systems of nonlinear systems in two variables
3. Solve nonlinear systems by substitution
4. Solve nonlinear systems by addition
5. Solve problems using systems of nonlinear equations

MODULE 5: CONIC SECTIONS AND ANALYTIC GEOMETRY

The student will be able to:

1. Graph ellipses centered at the origin and not centered at the origin
2. Write equations of ellipses in standard form
3. Solve applied problems involving ellipses
4. Locate a hyperbola's vertices and foci
5. Write equations of hyperbolas in standard form
6. Graph hyperbolas centered at the origin and not centered at the origin
7. Solve applied problems involving hyperbolas

8. Graph parabolas with vertices at the origin and not at the origin
9. Write equations of parabolas in standard form
10. Solve applied problems involving parabolas
11. Identify conics without completing the square
12. Use point plotting to graph plane curves described by parametric equations
13. Eliminate the parameter
14. Find parametric equations for functions
15. Describe the advantages of parametric representations
16. Define conics in terms of focus and directrix
17. Graph the polar equations of conics