

Math 1431: Syllabus

1 Course Information

- Course Title: Precalculus I
- Course Number: 1431
- Credit Hours: 5; Clinical Hours: 0; Lecture Hours: 5; Lab Hours: 0
- Meet Times: Monday, Wednesday, and Friday from 11:00 pm to 12:25 pm
- Meet Location: BIC 3551
- Course Description: Students will learn algebra with an emphasis on concepts needed for calculus. Topics include, but are not limited to, functions, conic sections, matrices and determinants, polynomial theory, rational functions, sequences and series, logarithmic and exponential functions, combinatorial mathematics, and mathematical induction
- Prerequisite: Demonstrated geometry competency (level 2), and MATH 0482 or college equivalent with a grade of C or better or a qualifying score on the mathematics placement test.

2 Instructor Information

- Name: Michael McCabe, M.S.
- Email: mccabem85@cod.edu
- Office: 3436B
- Office Phone: 630 942 2152
- Office Hours: Labeled on Blackboard (always available by appointment)

3 General Course Objectives

- 1 Solve equations and inequalities involving the following: quadratic, rational, and absolute value expressions
- 2 Analyze functions and relations, including their graphs
- 3 Determine limits of functions numerically and/or graphically
- 4 Analyze inverse functions, including their graphs
- 5 Construct the graphs of conic sections
- 6 Determine the equation of a conic section
- 7 Perform matrix operations
- 8 Calculate the value of determinants
- 9 Solve systems of linear equations using various methods

- 10 Solve systems of non-linear equations
- 11 Find the zeros of polynomials
- 12 Graph polynomial functions
- 13 Analyze exponential and logarithmic functions, including their graphs
- 14 Solve exponential and logarithmic equations
- 15 Solve applications of exponential growth and decay
- 16 Use the binomial expansion theorem
- 17 Use sequence and series notation including sigma notation
- 18 Determine elements and sums of arithmetic and geometric series
- 19 Use the principle of mathematical induction
- 20 Determine the domains and ranges of rational functions
- 21 Construct the graphs of rational functions indicating horizontal, vertical, and oblique asymptotes

4 Topical Outline

1. Review of algebra
 - a. Quadratic equations
 - b. Absolute value equations
 - c. Linear relations
 - d. Slope of a line ii. Graphs of lines iii. Parallel and perpendicular lines iv. Equation for a line
 - e. Exponents and radicals
2. Inequalities
 - a. Quadratic inequalities
 - b. Rational inequalities
 - c. Inequalities with absolute value
3. Relations and functions
 - a. Definitions
 - b. Function notation
 - c. Domain and range
 - d. Algebra of functions
 - e. Composition of two functions
 - f. Graphs
 - g. Graphs of function ii. Symmetry to the x-axis, y-axis, or origin iii. Graphs with symmetry iv. Horizontal and vertical translations
 - h. Odd and even functions
 - i. Special functions
 - j. Absolute value function ii. Greatest integer function iii. Square root function iv. Piecewise functions
 - k. Inverse of a function
 - l. Function notation for f^{-1} ii. Domain and range of f^{-1} iii. Graphs of f and f^{-1}

- m. Introduction to limits (optional)
 - n. Graphical approach ii. Numerical approach
4. Analytic Geometry
- a. Distance and midpoint formulas
 - b. Parabolas
 - c. Graphs of horizontal and vertical parabolas ii. Vertex, focus, directrix, and axis of symmetry
iii. Graphs of half of a parabola
 - d. Circles
 - e. Center-radius equation ii. General form equation iii. Graphs of circles or semi-circles
 - f. Ellipses
 - g. Graphs of ellipses or half of an ellipse ii. Major and minor axes iii. Center, vertices, and foci
iv. Eccentricity
 - h. Hyperbolas
 - i. Graphs of hyperbolas or half of a hyperbola ii. Equations of the asymptotes iii. Transverse
and conjugate axes iv. Center,
vertices, and foci
 - j. Eccentricity
 - k. Systems of non-linear equations
 - l. Systems of non-linear inequalities (optional)
5. Matrices and determinants
- a. Definition and dimension
 - b. Operations with matrices
 - c. Addition and subtraction ii. Scalar multiplication iii. Matrix multiplication
 - d. Gaussian elimination
 - e. Cofactors
 - f. Determinant theorems
 - g. Cramer's rule
 - h. Inverse of a matrix
6. Theory of polynomials
- a. Synthetic division
 - b. Remainder theorem
 - c. Factor theorem
 - d. Zeros of a polynomial
 - e. Conjugate pair theorem
 - f. Descartes' rule of signs
 - g. Integral bounds for zeros
 - h. Rational zero theorem
 - i. Approximation of zeros(optional)
 - j. Graphs of polynomial functions
7. Exponential and logarithmic functions
- a. Exponential functions
 - b. Definition ii. Graphs iii. Exponential equations

- c. Logarithmic functions
 - d. Definition ii. Graphs iii. Applications iv. Properties of logarithms
 - e. Logarithmic equations vi. Natural logarithm vii. The change of base formula
 - f. Exponential growth and decay
8. Combinatorial mathematics
- a. Factorial notation
 - b. Binomial theorem
 - c. Binomial expansion ii. k th term of a binomial expansion
9. Sequences and series
- a. Definitions
 - b. n th term of a sequence
 - c. Sigma notation
 - d. Arithmetic sequences and series
 - e. Definition ii. n th term of an arithmetic sequence iii. Formula for an iv. Sum of an arithmetic series
 - f. Geometric sequences and series
 - g. Definition ii. n th term of a geometric sequence iii. Formula for an iv. Sum of a geometric series
 - h. Sum of an infinite geometric series
10. Mathematical induction
- a. Principle of mathematical induction
 - b. Proofs
11. Partial fractions (optional)
- a. Distinct linear factors
 - b. Repeated linear factors
 - c. Distinct quadratic factors
 - d. Repeated quadratic factors
12. Rational functions
- a. Domain and range
 - b. Horizontal asymptotes
 - c. Vertical asymptotes
 - d. Oblique asymptotes

5 Required Texts, Materials, and Supplies

- Required Text: MyLab Math with Pearson eText -- Access Card -- for College Algebra (18-Weeks)
– ISBN: 9780135821992
- Access to MyLab Math is required. This means an access code must be purchased.

6 Schedule

- Spring Break: 3/27 to 4/2
- Finals: week of 5/15 (specific date will be announced on Blackboard)
- Homework Due Dates (tentative)
 - Homework set 1 (2/9)
 - * Sections: 1.6 1.7 1.8 2.1 2.2 2.3 2.4 2.5
 - Homework set 2 (2/19)
 - * Sections: 2.6 2.7 2.8
 - Homework set 3 (3/2)
 - * Section: 3.1 3.2 3.3 3.4
 - Homework set 4 (3/19)
 - * Sections: 3.5 4.1 4.2 4.3 4.4 4.5
 - Homework set 5 (4/13)
 - * Sections: 4.6 5.1 5.2 5.3 5.4 5.5 5.7
 - Homework set 6 (4/30)
 - * Sections: 5.8 6.1 6.2 6.3 6.4 7.1
 - Homework set 7 (5/14)
 - * Sections: 7.2 7.3 7.4 7.5
- Exam Dates (tentative)
 - Exam 1 (2/20)
 - * Homework set 1 and 2
 - Exam 2 (3/20)
 - * Homework set 3 and 4
 - Exam 3 (5/1)
 - * Homework set 5 and 6

7 Method of Evaluation

Grading scale will be 90-80-70-60-50 A-B-C-D-F. I do round and no curve.

Homework 30 percent of the overall grade will be MyLab Math (MML) Homework. Every sections we cover in the course will be assigned a MyLab Math Homework assignment. Look under Section Schedule for the due dates for those assignments. **No extensions will be given for MML assignments. However, there will be at least 3 of the lowest scores will be dropped from the overall homework average.** This means, worse case scenario, if 3 section assignments are not complete, then those 3 assignments will not effect the overall homework average.

Exams 40 percent of the overall grade will be an in class exams. There will be three exams taking place on Mondays. The dates for the exams are listed in Section Schedule. **There are no retakes for exams or test corrections for exams.** Students with accommodations (from the department of access and accommodations) are required to email me proper paperwork as needed. If unable to make it to the exam (excuse not required but accepted) the notification must be given prior to the time of the exam.

Final 20 percent of the overall grade will be an in class final exam. The date and time of the final exam will be announced in Blackboard. The exam will contain all the material covered in the class.

In-Class 10 percent of the overall grade will be an in class assignment. This will be something like an problem is provided and with a smart device the worked out problem will be photographed and uploaded to Blackboard. The assessment will be graded on completion.

8 Academic Honesty

As members of the College of DuPage community, we share a commitment to the highest standards of learning and ethical behavior. The College and its faculty strive to build meaningful and productive relationships with our students. The expectation of honesty and effort is the foundation of that relationship. Academic dishonesty damages the learning partnership built between student and faculty and is considered a serious breach of the principles of learning and growth. Violations of the Code of Academic Conduct will be dealt with appropriately and may become part of a student's educational record. Please don't risk it! For further information about the expectations, please review the Code of Academic Conduct found at the following website: Code of Academic Conduct.

9 Access and Accommodations

- As a course policy, I do not accept late work/make up for My Open Math assignments, attendance, and participation. I am committed to providing fair, equal, and unbiased accommodations. If you believe that your circumstances qualify you for accommodations, please contact the Center for Access and Accommodations at access@cod.edu. Staff from the Center can help you better understand if your situation qualifies you for an accommodation.
- If you are student who is registered with the Center for Access and Accommodations, please send me your Letter of Accommodation as soon as possible.
- Please do not send me personal medical records or similar personal documents.
- Here is a to start the process for accommodations: Center for Access and Accommodations Intake Form (https://cod-accommodate.symlicity.com/public_accommodation/).

The College of DuPage is committed to the equitable access of educational opportunities for students with disabilities in accordance with The Americans with Disabilities Act, As Amended and Section 504 of the Rehabilitation Act of 1973. Any student who feels they may need an accommodation on the basis of an illness, injury, medical condition, or disability should contact the Center for Access and Accommodations to determine eligibility for accommodations and to obtain an official Letter of Accommodation. The Center for Access and Accommodations can be reached via email at access@cod.edu. Students may also initiate a request for services by going to www.cod.edu/access and clicking on the green box labeled "complete form to request accommodations." If you are already registered with the Center for Access and Accommodations, please email me your Letter of Accommodation as soon as possible. Please DO NOT send any private health documentation or Doctor's notes to me.

10 Withdraw Policy

Withdrawal from a Class

The final day for a student to withdraw from any course will be equal to 75% of the time for the respective academic session (see the Registration Calendar) through MyAccess or in person at the Registration office, Student Services Center (SSC), Room 2221.

Administrative Withdrawal

After the deadline, students will be required to appeal for late withdrawal and provide appropriate documentation to the Student Registration Services Office for all requests. Students who are granted approval to withdraw by petition will not be eligible for refunds of tuition or fees and will receive a 'W' grade on their transcript. Appeals must be submitted prior to the designated final exam period for 16-week classes and before the last class meeting for all other session classes.

Coronavirus Information

Stay up to date with information provided by the college about alternative withdrawal policies. Coronavirus Information