MATH-1431-006: 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 1230 to 1355
- Meet Location: BIC 3459
- 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.
- Repeatable for Credit: NO
- Pre-Enrollment Criteria: N/A
- Prerequisite: Demonstrated geometry competency (level 2), and MATH 0482 or college equivalent with a grade or 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 or Blackboard Collaborate
- Office Phone: 630 942 2152
- Office Hours: Labeled on Blackboard (always available by appointment)

3. GENERAL COURSE OBJECTIVES

Upon successful completion of the course the student should be able to do the following:

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. kth term of a binomial expansion

9.: Sequences and series

     a.: Definitions

     b.: nth term of a sequence

    c.: Sigma notation
    d.: Arithmetic sequences and series
    e.: Definition ii. nth term of an arithmetic sequence iii. Formula for an iv. Sum of an arithmetic series
    f.: Geometric sequences and series
    g.: Definition ii. nth 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**: College Algebra
- **Materials**: Access code for My Lab Math, notebook for taking notes in class, writing tools, and if possible a internet enabled device.
- **Supplies**: Internet, extra notebooks, and extra writing tools

6. Schedule

6.1. Academic Calendar.

- First Day: 08/25/2025
- No Class: 9/1, 11/26, 11/27, and 11/28
- Last Day to Withdraw: 11/16
- Final Exam: Monday, December 15 from 1200 to 1350

6.2. Exam Dates (Tentative).

- Exam 1: 9/19
- Exam 2: 10/17
- Exam 3: 11/14

6.3. Content Coverage.

- Week 1 start and finish part of chapter 1
- Week 2,3, and 4 start and finish chapter 2 then take an exam on chapter 1 and 2.
- Week 5 and 6 start and finish chapter 3 and start chapter 4
- Week 7 and 8 finish chapter 4 and then exam 2 on chapters 3 and 4
- Week 9 start chapter 5

- Week 10 spring break
- Week 11 finish chapter 5
- Week 12 start some of chapter 6 and exam 3
- Week 13 finish chapter 6 and start chapter 7
- Week 14 and 15 finish chapter 7
- Week 16 catch up week.

7. METHOD OF EVALUATION

(1) Exams [Weight 35%]
    (a) No drops and no retakes.
(2) Quizzes [Weight 35%]
    (a) At least 3 drops and no retake
(3) My Lab Math Homework Sets [Weight 10%]
    (a) At least three of the lowest scores will be dropped.
(4) Final Exam [Weight 20%]
    (a) Test on everything covered throughout the semester (Cumulative Exam).
    (b) Constructed to be completed during a 2 hour time limit on the scheduled Final Exam day.
    (c) I plan to construct the Final Exam with about 20 questions.
    (d) I plan to construct the Final Exam similar to twice the amount of a regular exam.

7.1. Grade Scale.

A: 90% to 100%
B: 80% to 89%
C: 70% to 79%
D: 60% to 69%
F: 59% or less

I do round.

8. ULTRA COURSE VIEW PILOT

Welcome to Math 1431! This course is part of a pilot program for Blackboard Ultra Course View, a user-friendly learning management system designed to enhance your online learning experience. You may engage with various newly available tools and features within the platform to access course materials, participate in discussions, submit assignments, and receive feedback. This pilot of Blackboard Ultra does not change course credits or the instructor established grading basis and course requirements.

Throughout the term, you may be asked to provide feedback through anonymous course surveys. Please be as candid as possible as this is an opportunity for both instructors and students to explore and provide feedback on the Blackboard Ultra Course View experience.

If you, at any time, experience any difficulties using the Ultra Course View, the College has technical support available just for you. Please send us an email at studentultrahelp@cod.edu. Staff are available during traditional business hours (8am − 5pm) and we will get back to you as soon as possible. For on-demand help, please use Blackboard Learn Help for Students −{} Ultra Course View.

9. 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.

10. 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.symplicity.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.

11. 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