COMMUNITY COLLEGE

COURSE SYLLABUS

Course Syllabus Details

Topic	Detailed Information
Course Name	College Algebra Online
Course CRN and Term	Covers 3 Sections: G81, G82 and G84, with CRNs 20813, 20816 and 22043, respectively. Course will be administered through a single shell on Brightspace by D2L.
GT Pathways Category	GT-MA1: Mathematics
Credits and Delivery Method	4 Credits. Online
Time Expectation	12 hours per week.
Location of Class	Online
Meeting Dates and Time	TBA
Instructor	Harry S. (Steve) Mills
E-mail	Hmills1@online.aims.edu
Office Location	Online
Phone Number	970-290-0550
Office Hours	TBA – I prefer to be on-demand to the extent possible.
Drop Deadline Date	September 2nd, 2022 Your ability to add courses after this date may be limited. See your advisor for assistance with class scheduling.
Course Withdrawal Date	November 2nd, 2022 Remember, withdrawal does not come with any reductions or refunds in tuition. A withdrawal will also place a "W" grade on your transcript. Please contact your advisor to see if a withdrawal is appropriate given your specific situation.
Other Important Dates	Academic Calendar Course Schedule
Student Services	https://www.aims.edu/student-life/student-services

Course Requirements

Topic	Detailed Information
Prerequisite(s)	College-level readiness as determined by review of high school transcripts, assessment, and/or meeting with an Aims Academic Advisor.
Co-requisite(s)	
Academic Policies – These Standards of Behavior statements apply to	Closely review these policies at:

Topic	Detailed Information
every course at Aims Community College and are hereby incorporated into this document.	https://www.aims.edu/academic-policies&[page
Materials	Graphing calculator or online grapher for some homework. MyLab and Mastering online learning management system, where you will do homework and take tests.
Other Necessary Items	MyLab and Mastering comes with an e-book. If you want a physical copy of the text, almost any edition of College Algebra by Dugopolski will suffice. The bookstore may have a nice deal bundled for new book with access to MyLab.

Course Information

Course Description: Focuses on a variety of functions and the exploration of their graphs. Topics include: equations and inequalities, operations on functions, exponential and logarithmic functions, linear and non-linear systems, and an introduction to conic sections. This course provides essential skills for Science, Technology, Engineering, and Math (STEM) pathways. This is a statewide Guaranteed Transfer course in the GT-MA1 category. Course readiness is determined by review of high school transcripts, assessment, and/or meeting with an Aims Academic Advisor. Course is not repeatable for credit.

Course Learning Outcomes – According to the Colorado Community College Common Course Database, upon completion of this course, the student/learner should be able to:

1. Identify properties of functions including domain, range, increasing and decreasing.

2. Apply function notation.

3. Determine the inverse of a function.

4. Examine functions algebraically.

5. Analyze behavior and roots of polynomial functions.

6. Solve polynomial, rational and absolute value equations and inequalities.

7. Analyze polynomial, exponential, logarithmic and rational functions.

8. Create graphs of polynomial, exponential, logarithmic and rational functions.

9. Solve exponential and logarithmic equations.

10. Analyze piecewise functions.

11. Graph parent functions and their transformations.

12. Utilize algebraic techniques to solve application problems.

13. Solve systems of equations.

14. Classify conic sections. Competency:

Recommended Topical Outline

I. Functions including domain, range, increasing and decreasing
   A. Definition of a function
   B. Identifying functions given table, graph or equation form
   C. Domain and range of algebraic functions
   D. Even and odd functions
   E. Introduction to where functions are increasing and decreasing using a graph
   F. Introduction to maxima and minima using a graph
II. Function notation
   A. Functions expressed using function notation
   B. Evaluation of function notation from equations and graphs
   C. Difference quotient
III. Inverse of a function
   A. Notation of an inverse function
   B. Definition of one-to-one functions
   C. Algebraic determination of the inverse of a function
   D. Graphical properties of an inverse function
   E. Domain and range of an inverse function
IV. Function composition algebraically
   A. Sum difference, product, quotient of functions
   B. Composition notation
   C. Inverses using composition
   D. Composition of two functions
   E. Domain of a composite function
   F. Decomposition of a function
V. Behavior and roots of polynomial functions
   A. End behavior of polynomial functions
   B. Division of polynomials
   C. Polynomials as a product of linear factors
   D. Multiplicity of zeros
   E. Complex zeros
   F. The Rational Root Theorem
   G. The Remainder Theorem and the Factor Theorem
VI. Polynomial, rational and absolute value equations and inequalities
   A. Completing the square to find the vertex form of a quadratic function
   B. Absolute value inequalities
   C. Polynomial and rational inequalities using test intervals (critical values, number lines)
   D. Methods of solving quadratic equations
   E. Solving equations reducible to quadratic form using substitutions
   F. Review of solving rational equations
VII. Analysis of polynomial, exponential, logarithmic and rational functions
   A. Intercepts and End behavior
   B. Zeros
   C. Definition of exponential and logarithmic functions
   D. Domain and range
   E. Evaluation of exponential and logarithmic expressions
   F. Introduction to the number e
   G. Equations of asymptotes
VIII. Graphs of polynomial, exponential, logarithmic and rational functions
   A. Intercepts and end behavior
   B. Asymptotes of functions from the equation and from the graph

C. Identifying the removable discontinuities of a rational function
D. Determining if a graph crosses horizontal asymptotes

IX. Solutions of exponential and logarithmic equations
A. Conversion between exponential and logarithmic form
B. Properties of logarithms
C. Logarithmic equations
D. Extraneous solutions
E. Exponential equations
F. Change of base formula

X. Piecewise functions
A. Notation for piecewise functions
B. Evaluation of piecewise functions
C. Graphs of piecewise functions
D. Domain of piecewise functions

XI. Parent functions and their transformations
A. Parent (also called base/toolbox) functions
B. Rigid transformations (horizontal/vertical translations and reflections)
C. Non-rigid transformations (horizontal/vertical scaling)

XII. Algebraic techniques to solve application problems
A. Quadratic models including optimization
B. Exponential/logarithmic models
C. Direct and inverse variation

XIII. Systems of equations
A. Methods for solving systems with three variables or more
B. Systems of non-linear equations with two variables
C. Types of solutions (consistent, inconsistent, independent and dependent)

XIV. Conic sections
A. Circle
B. Parabola
C. Ellipse
D. Hyperbola
E. Analysis of the properties of conic sections

State General Education and Common Learning Outcomes: (for GT Pathways Courses)

Competency: Quantitative Literacy:

Students should be able to:

1. **Interpret Information**
    a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. **Represent Information**
    a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).
3. **Perform Calculations**
    a. Solve problems or equations at the appropriate course level.
    b. Use appropriate mathematical notation.
    c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.
4. **Apply and Analyze Information**

   a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.
   b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
   c. Make judgments based on mathematical analysis appropriate to the course level.
5. **Communicate Using Mathematical Forms**
   a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

Aims Common Learning Outcomes – These outcomes define the expectations of an Aims Community College education and provide the benchmarks against which the college holds itself accountable. Find the outcomes at

https://www.aims.edu/departments/institutional-research/assessment

Course Delivery Method

Online, via Course Shell (Brightspace by D2L) and MyLab and Mastering by Pearson

Code of Conduct

To keep our college community safe, students are expected to comply with health guidelines as directed by the College, public health officials, and/or ordinance of a municipality, county, Governor of the State of Colorado, or any Executive Order of the President of the United States. Download the complete copy of the Student Code of Conduct.

MY one rule is "Common Sense and Common Courtesy." If you can't practice these, then we'll find the rule you broke.

Reuse of Instructional Materials

Reuse or distribution of instructional materials (e.g., PowerPoints, videos, class recordings, assessments, etc.) or student created content (e.g., online discussion posts, presentations, etc.) without approval is prohibited.

Attendance Policy

Your attendance will be tracked by your progress made on the homework and tests.

Communication and Feedback

Primary communication will be via e-mail, although you may certainly call me on my cell phone any time.

Grading

3 simple categories:
Homework – 30%
Tests – 60%
E-Mail Settings – 10% - Just change your settings in D2L e-mail tool to include previous message in your replies (so I know what we're talking about!)

Grading Scale

Percentage	Grade	Details
90% - 100%	A	(Superior and excellent)
80% - 89%	B	(Above average)
70% - 79%	C	(Average)
60% - 69%	D	(Below average level of achievement)
Below 60%	F	(Not acceptable)

Course Schedule:

Broken down by week, class session, etc. Consider including as a separate document for ease of use. It is helpful to have chapter titles attached (versus just Chapter 1, Chapter 2) and to also associate which Common Learning Outcome (CLO) is addressed in that chapter.

Other Important Details

Add any other important and pertinent information below