

ACADEMIC SKILLS AND GENERAL STUDIES DIVISION**CONTACT AND COMMITMENT:**

619-4240, Division Dean

986-6906, ACSK Mathematics Lead Faculty

619-4331, Secretary

*To offer curriculum and instructional methods that guide each learner
to develop the skills and attitudes leading to academic and career success.*

ACSK 0104 FOUNDATIONS OF ALGEBRA

A combined beginning and intermediate algebra course, computer-based and preparing for college-level mathematics by identifying and supporting the student's need in beginning algebra skill development as well as covering intermediate algebra material. The course extends to radical variable expressions and equations; solving quadratic equations and systems of linear equations; function notation and graphing lines, parabolas and linear inequalities in two variables, and problem solving techniques. Internet access from home is required. **PREREQUISITE:** Recent completion of Prealgebra (ACSK 0013) with an A, or minimum placement score: COMPASS: Prealgebra-39 & Algebra-35, ASSET Numerical Skills-40 & Elementary Algebra-36, or ACT Math-15. Some algebra background is required. If prerequisites have not been met, drop this class or speak to the ACSK Mathematics Lead Faculty or Division Dean.

CREDIT HOURS: 4 credit hours, none counting toward any degree requirements.

TARGET AUDIENCE AND TRANSFER: This course is intended for college students who have had some algebra instruction, and who are highly motivated to learn two semesters of content in the span of a single semester. This course is also for those students needing a review of high school algebra concepts to strengthen skill in preparation for college algebra study. Foundations of Algebra is a non-transfer course.

INTELLECTUAL DEVELOPMENT CORE:

Goals for student thinking that encourage intellectual risk, modeling and problem solving, and independent exploration all lead to the Foundations of Algebra course preparing productive workers and citizens with the following skills:

1. Persistence in independent problem solving and departing from rote procedure.
2. Develop communication skills within the context of real applications.
3. Actively explore solutions graphically to clarify algebraic approaches.
4. Gather, organize and summarize data.
5. Apply a variety of symbolic approaches to problem solving.
6. Allow for problems without unique solutions and judge the reasonableness of results.
7. Use technology for exploring, building ideas and as a natural tool for realistic mathematics problems.

CONTENT CORE:

A student successfully completing Foundations of Algebra, ACSK 0104, will demonstrate these ten primary course competencies:

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| 1) Write the equation of a line in slope-intercept form given the y-intercept in point form and another point on the line. | 6) Find the solution of a linear equation |
| 2) Graph any linear equation including horizontal and vertical. | 7) Model a linear problem using algebraic process. |
| 3) Solve a consistent system of two equations in two variables. | 8) Graph a linear equation in two variables. |
| 4) Solve a quadratic equation with irrational solutions and reducible radical. | 9) Simplify an exponential expression. |
| 5) Model linear, rational, Pythagorean, and quadratic problems using algebraic process. | 10) Factor a second-degree polynomial. |
- Additionally, meet all core objectives of Prealgebra (see Prealgebra course outline).

ADDITIONAL CONTENT EMPHASIS—A student successfully completing Foundations of Algebra, ACSK 0104, will also be able to:

- 1) Solve formulas for a secondary variable.
- 2) Perform addition, subtraction, and multiplication on polynomials.
- 3) Factor all types of polynomials.
- 4) Find the solutions of (factorable) quadratic and rational equations.
- 5) Perform operations on rational expressions.
- 6) Perform operations on radical expressions.
- 7) Solve a linear inequality in one variable and graph the solution on a real number line.
- 8) Graph any linear equation and inequality in two variables, and radical and quadratic functions.
- 9) Solve quadratic equations via a variety of methods, including those with complex number solutions.
- 10) Work with functions, recognize functions, evaluate and graph functions, find the domain (graph & formula) and range (graphs).
- 11) Work with slope concepts (determine slope given any of: two points, a graph, an equation).

REQUIRED FORMS OF ASSESSMENT: In all sections of Foundations of Algebra, a divisional pre-diagnostic is given to help evaluate incoming skill relative to course success and end of semester assessments measure core content skill. Grouped statistics on overall student performance are used in faculty discussions on strengthening the learning environment and evaluations. To assess the primary goal for all developmental math courses, an ACSK Developmental Education Performance Report for math success indicates that students who are successful at Intermediate Algebra succeed in College Algebra at a rate comparable to students placed directly into that course.

REQUIRED:

TEXT: Elementary and Intermediate Algebra. Mark Dugopolski. McGraw Hill. New York: 2002.

PROGRAM GUIDE: ALEKS Student User's Guide available online at <http://www.highed.aleks.com/manual/educators/node126.html>

REQUIRED TOPIC LIST –TEXTCh 1: Real Numbers and Their Properties

Review Exercises, Pages 62-63: 1-14 all problems; 15-149 odds only; 150

Ch 2: Linear Equations in One Variable

- 2.1: The Addition and Multiplication Properties of Equality
- 2.2: Solving General Linear Equations
- 2.3: Identities, Conditional Equations, and Inconsistent Equations
- 2.4: Formulas
- 2.5: Translating Verbal Expressions into Algebraic Expressions
- 2.6: Number, Geometric, and Uniform Motion Applications
- 2.7: Discount, Investment, and Mixture Applications

NOTE: All of Chapter 1, in addition to 2.1, 2.2, and 2.5 are review topics for students correctly placed into this course.

Ch 3: Inequalities in One Variable

- 3.1: Inequalities
- 3.2: Compound Inequalities
- 3.3: Absolute Value Equations and Inequalities

Ch 4: Linear Equations in Two Variables and Their Graphs

- 4.1: Graphing Lines in the Coordinate Plane
 - 4.2: Slope
 - 4.3: Equations of Lines in Slope-Intercept and Standard Form
 - 4.4: The Point-Slope Form [use these examples and problems, but teach using slope-intercept form]
 - 4.6: Introduction to Functions
- Calculator close-ups: pages 161, 183, 184

Ch 5: Polynomials and Exponents

- 5.1: Addition and Subtraction of Polynomials
- 5.2: Multiplication of Polynomials
- 5.3: Multiplication of Binomials
- 5.4: Special Products
- 5.5: Division of Polynomials
- 5.6 Positive Integral Exponents
- 5.7: Negative Exponents and Scientific Notation

Ch 6: Factoring

- 6.1: Factoring Out Common Factors
- 6.2: Factoring the Special Products and Factoring by Grouping
- 6.4 Factoring $ax^2 + bx + c$ with $a \neq 1$
- 6.5: The Factoring Strategy
- 6.6: Solving Quadratic Equations by Factoring

Ch 7: Rational Expressions

- 7.1: Reducing Rational Expressions
- 7.2: Multiplication and Division
- 7.4 Addition and Subtraction
- 7.5: Complex Fractions
- 7.6: Solving Equations with Rational Expressions
- 7.7: Applications of Ratios and Proportions
- 7.8: Applications of Rational Expressions

Ch 8: Systems of Linear Equations and Inequalities

- 8.1: Solving Systems by Graphing and Substitution
 - 8.2: The Addition Method
 - 8.6: Graphing Linear Inequalities in Two Variables
- Calculator close-ups: page 394

Ch 9: Radicals and Rational Exponents

- 9.1: Radicals
 - 9.2: Rational Exponents
 - 9.3: Operations with Radicals
 - 9.4: More Operations with Radicals
 - 9.5: Solving Equations with Radicals and Exponents
 - 9.6: Complex Numbers
- Calculator close-ups: pages 469, 470, 478, 480, 488, 490

Ch 10: Quadratic Equations, Functions, and Inequalities

- 10.1: Factoring and Completing the Square
 - 10.2 The Quadratic Formula
 - 10.3: Quadratic Functions and Their Graphs
 - 10.4: More on Quadratic Equations
- Calculator close-ups: (use ROOT or ZERO instead of TRACE)
Pages 529, 530, 536, 537, 538, 548

Ch 11: Functions

- 11.1: Graphs of Functions and Relations
 - 11.2: Transformations of Graphs
- Calculator close-ups: Pages 548, 592, 594, 595,

REQUIRED TOPIC LIST – ALEKS – 6 hours/week (this work will count for 15% of your course grade) Please see web page: highed.aleks.com

STUDENT RESOURCES:**ACSK 0104 Foundations of Algebra**

<i>What.....</i>	<i>Why.....</i>	<i>Where.....</i>	<i>Product info</i>
Student Solutions Manual	Step by step solutions to odd-numbered exercises & more.	Learning Lab BH 1109	McGraw-Hill
Tutorial CD-ROM	Self-paced; unlimited opportunities for review and practice.	Included with textbook	Free computer tutorial specifically linked to text.
Peer and Faculty tutors	Discuss specific homework questions, help prepare for exams.	NWACC Learning Lab BH 1109, Math Café MAT 10.	See Learning Lab Web Site for Schedule Details
Texas-Instruments 82 or 83 Graphing Calculator	Permits home practice with the graphing calculator.	Go to Cashier's window in BH, then take receipt to Math Secretary, MAT 02	\$30 semester rental cost.
Text-specific publisher website	Interactive applications, algorithmically-generated practice exercises, online quizzing, audio/visual tutorials, all chapters of the text in PDF format, and links to useful and fun algebra websites.	http://highered.mcgraw-hill.com/sites/0072450282/student_view0/	At this time, this Online Learning Center is not pass-code-protected, so no special code is needed.

