CAPITAL COMMUNITY COLLEGE
COURSE OUTLINE
INTRODUCTORY ALGEBRA

SECTION I

SUBJECT AREA & COURSE NUMBER: MAT* G094

COURSE TITLE: *Introductory Algebra*

COURSE CATALOG DESCRIPTION: *Introductory Algebra* addresses algebraic symbolism, properties of the real numbers, operations on algebraic expressions, solving linear equations and inequalities, operations on polynomials, laws of exponents, factoring, solving quadratic equations by factoring, graphing equations, finding equations of lines, applying algebra to geometry, introduction to metric system, converting between units of measure, and scientific notation.

LECTURE HOURS PER WEEK: 4   **CREDIT HOURS:** 0

PREREQUISITES: Qualifying score on Placement Test or MAT* G075

SECTION II
A. SCOPE:
The objective of MAT* G094 is to enable the student to develop an understanding of the generalization known as "the variable" and to work with, interrelate, and apply the principles of algebra governing: exponents, solution of linear equations (and certain other equations reducible to linear form), solution of linear inequalities, operations on polynomials, factoring, solution of quadratic equations by factoring, and the relationship between a line and its equation. The course also introduces the metric system, converting between units of measure, and scientific notation.

B. REQUIRED WORK: determined by the instructor as described in the course syllabus

C. ATTENDANCE AND PARTICIPATION: Students are expected to attend each class, arrive on time, take exams at the scheduled time, and participate in the in-class learning process. (Specific instructor policies are included on the course syllabus.)

D. METHODS OF INSTRUCTION: The methods of instruction are determined by each instructor and may include but are not limited to lecture, lecture/discussion, small group collaborative learning, experiment/exploration, distance learning, student presentations, use of technologies such as audiovisual materials, computer, and calculator.

[2-23-04 B: Draft submitted for Senate approval, subsequently edited for correct common course descriptors and minor corrections: Date 5-03-04]

E. OBJECTIVES, OUTCOMES, ASSESSMENT

The following objectives and outcomes represent the department's core requirements for student achievement. To assure an effective articulation of *Prealgebra*: *Number Sense, Geometry* and *Introductory Algebra*, it is important to contrast learning outcomes continued from *Prealgebra*: *Number Sense, Geometry* with those that are introduced for the first time in *Introductory Algebra*. In the following table, the designator ***C** identifies learning outcomes continued from *Prealgebra*: *Number Sense, Geometry*; the designator ***N** identifies learning outcomes that are addressed for the first time in *Introductory Algebra*. Continued topics are treated more rapidly as a review, or they are extended and deepened.

Learning Objectives	Learning Outcomes	Assessment Methods
To demonstrate an understanding of:	**Student will:**	**As measured by:**
1) Foundation concepts for algebra	a) Identify and use real number properties, including the inverse and identity properties, and the zero factor property ***C** b) Add, subtract, multiply, and divide signed numbers, including rational numbers represented in fraction or decimal form ***C** c) Simplify algebraic expressions – application of properties, like terms, order of operations ***C** d) Evaluate powers having integer exponents ***N** e) Use laws of exponents where the exponents are integers ***N**	Written in-class quizzes, tests, and examinations: presentations to the class; out-of-class projects; written reports; portfolios; class participation; homework assignments

2) Concepts related to equations and inequalities	a) Solve equations that can be reduced to a linear equation in one variable
	     i) Apply addition, subtraction, multiplication and division properties of equality to reduce equations to the form, $x = k$ ***C**
	     ii) Substitute given numbers in a formula to produce an equation in one variable ***C**
	 b) Solve an equation in several variables for a first degree variable in terms of the remaining variables – concept of formula, literal equation ***N**
	 c) Formulate a linear equation that models an authentic situation, and use the equation to explore the situation *C
	 d) Write an inequality based on a given authentic situation ***N**
	 e) Solve linear inequalities in one variable ***N**
	 f) Solve a quadratic equation in one variable by factoring ***N**
	 g) Define, find, and use real roots of numbers ***N**	

3) Concepts related to polynomials	a) Identify a polynomial and use pertinent terminology ***N** b) Evaluate a polynomial ***N** c) Add, subtract, and multiply polynomials; divide a polynomial by a monomial ***N** d) Factor polynomials over the integers (common factor, difference of squares, general trinomials, perfect square trinomials, factoring by grouping) ***N** e) Solve an authentic problem that is modeled by a polynomial relationship ***N**	
4) Concepts related to the graph of an equation in two variables	a) Find the solution of a linear equation in two variables – ordered pairs ***N** b) Properly label a coordinate system and set up scales for the axes ***C** c) Graph sets of ordered pairs on a coordinate system ***C** d) Graph a linear equation in two variables by plotting ordered pair solutions ***N** e) Graph a linear equation in two variables by plotting the x-and y-intercepts ***N** f) Calculate and interpret the slope of a line ***N** g) Graph the equation of a line using its slope and y-intercept ***N** h) Given two points on a line, find its equation in point-slope and slope-intercept form ***N** i) Formulate a linear equation in two variables that models an authentic situation and use the equation to explore the situation ***N**	

E. OBJECTIVES, OUTCOMES, ASSESSMENT Continued:

Learning Objectives	Learning Outcomes	Assessment Methods
To demonstrate an understanding of:	Student will:	As measured by:

5) Applications of algebra to geometry and measurement	a) Apply algebra to find the volume of a rectangular prism, cylinder, cone, and sphere ***N**
	b) Apply algebra to find length using similar triangles ***C**
	c) Apply algebra to find length using the Pythagorean Theorem ***N**
	d) Solve an authentic situation that is geometry based, and use the solution to explore the situation ***N**
	e) Use the Metric System for area, volume/ capacity (units cubed, liters), mass, weight, temperature, time ***N**
	f) Convert between units of measure - use dimensional (unit) analysis ***N**
	g) Perform calculations using scientific notation ***N**
	  • Convert from scientific notation to standard form and vice versa
	  • Justify and use the following identities
	    $(aA)(bB) = (ab)(AB)$
	    $\dfrac{aA}{bB} = \dfrac{a}{b} \cdot \dfrac{A}{B}$
	  • Carry out operations using scientific notation
	h) Solve a problem embedded in an authentic situation that involves measurement and convert between measurements expressed in different units ***N**	

Note 1: The foregoing list of learning outcomes should not be considered exhaustive: other learning outcomes may also support the objectives. The list is not intended to limit the learning outcomes that can be used to achieve the objectives.

Note 2: The order in which the learning outcomes are addressed and the relative emphasis given to each will vary from instructor to instructor.

Note 3: There is no expectation that an instructor will employ all the assessment methods or any particular set of them. Also, the list of applicable assessment methods is not exhaustive. Other methods that measure the learning outcomes may be used.

Note 4: It is important to recognize that courses are not delivered in a social vacuum. Any bona fide assessment of a course must take account of out-of-class life demands on students that adversely impact academic success.

F. TEXTS AND MATERIALS: A text selected by the Mathematics Section of the Science and Mathematics Department with content and presentation that support the Learning Objectives and Outcomes given in Part E above

G. INFORMATION TECHNOLOGY: A scientific calculator