

<b>Course Outcomes Guide (COG)</b>
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**Course Title:** MAT 101 College Algebra

**Date:** August 2018

**Course Team:** Paula Kessler, Lead Instructor for MAT 101, and other Math Faculty

**Expected Learning Outcomes**

**STUDENT LEARNING OUTCOMES:**

**Upon successful completion of this course students will be able to:**

**COURSE CONTENT OBJECTIVES:**

1. Use computational techniques and algebraic skills essential for success in an academic, personal, or workplace setting. (Computational and Algebraic Skills)
2. Use visualization, special reasoning, as well as geometric properties and strategies to model and solve linear equations and inequalities algebraically and graphically. (Geometric and Algebraic Skills)
3. Use and apply topics for the course to solve application problems. (Application Skills)
4. Communicate and Understand mathematical statements, ideas and results, both verbally and in writing, with the correct use of mathematical definitions, terminology and symbolism. (Communication Skills)

**Upon successful completion of this course students will be able to:**

1. evaluate and/or simplify arithmetic and algebraic expressions using the order of operations agreement. (1,2,4)
2. simplify algebraic expressions using the definitions and properties of exponents (1,4)
3. simplify algebraic expressions containing fractions and/or radicals using the (1,4) definitions and properties of fractions and radicals (1,4)
4. add, subtract, multiply polynomials (1,4)
5. factor polynomials of the form  $ax^2 + bxy + cy^2$  and sum and difference of two cubes (1,4)
6. add, subtract, multiply, and divide complex numbers, to simplify powers of  $i$  and replace principal square roots of a negative number with an expression involving  $i$  (1,4)
7. solve first degree equations with one variable, solve a formula for a specified variable in terms of the others and to apply these skills to application problems (1,3,4)
8. solve quadratic equations and equations that relate to quadratic equations including equations that involve radicals (1,3,4)
9. solve inequalities with one variable including first degree and rational (1, 2, 4)
10. solve first degree absolute value equations and inequalities (1, 2, 4)

11. find function value and perform operations with functions including compositions (1, 4)
12. graph a linear relation; find the slope of a line including those that are parallel or perpendicular to a given line. (1, 2, 4)
13. write an equation of a line when given a point and enough information to know its slope (1, 2, 4)
14. recognize an equation as being an equation for a circle and then finding the center and the radius of that circle (1, 2, 4)
15. write an equation for a circle when given the center and enough information to find the radius (1, 2, 4)
16. recognize and sketch quadratic functions by finding the vertex, intercepts, and any other necessary information (1, 2, 4)
17. divide polynomials using long division and synthetic division and to apply synthetic division to find values of polynomial functions and to solve polynomial equations (1, 4)
18. solve systems of first degree equations involving two variables (1, 3, 4)
19. evaluate and solve exponential and logarithmic functions (1,4)
20. find the inverse of a function (1,4)
21. graph exponential and logarithmic functions (1,4)
22. solve problems involving variation (direct, inverse and joint) (1,3,4)
23. graph polynomial functions using transformations (1,4)
24. analyze the graph of a polynomial function (1,4)
25. find the asymptotes of a rational function (1,4)
26. find the real and complex zeros of a polynomial function (1,4)
27. convert between degree and radian measure (1,4)
28. solve applied problems with similar triangles (1,3,4)
29. identify and use the trigonometry functions (1,3,4)

### **Assessment**

All MAT 101 College Algebra students are completing the same homework, quizzes, tests, and 7 question assessment. We are using MyMathLab to run the course and all instructors are using the same assignments. All College Algebra students are also taking our 8 question General Education Assessment.

### **Validation** (What methods have you used or will you use to validate your assessment?)

We are using a rubric to grade the 5 question assessment, and then making comparisons to previous semesters. In the past we have used the CAAP test to compare our students to the national norm. The college has used MAPP as well to compare HCC students to the national norm. In both cases the HCC students have been above the national norm.

Spring 2013 we gave the CAAP test to 3 sections of College Algebra from 3 different instructors. In spring 2013 the national average on CAAP was 56.1% and HCC was 57.2% for mathematics.

Fall 2015 we gave the CAAP Mathematics test to 4 general education math sections: 2 of those were college algebra classes, and 2 were statistics sections. The national average on CAPP was 56.1% and HCC was 57.2%. The CAPP Mathematics Sub-Score breaks down into 2 parts, one is basic algebra and the other is college algebra. HCC's average was 14.8 and the national average 14.2 in basic algebra. HCC's average was 14.5 and the national average was 14.0 in college algebra.

## **Results**

Our SLOA data is showing improvement to student learning. Since the start of the College Algebra Redesign in Fall 2007 with our pilot section and full implementation in Spring 2008 we have increased the rigor of the course in Fall 2009 and Fall 2011.

We complete the 5 question assessment every semester in all classes. The questions changed in Fall 2009 to include more material true to the class.

Fall 2014 we changed the 5 question common SLOA to 7 questions. This allowed us to change the course content objectives and map them to the SLOA questions for a more accurate measurement of our objectives.

Fall 2015, we added trigonometry topics to the course. We are hoping this will help in our pre-calculus class and calculus classes. We have found that one of the weak topic areas students have is in trigonometry when they move to our upper level classes.

## **Follow-up**

We have made changes in Fall 2007, Fall 2009, Fall 2011, and Fall 2012 as a result of our SLOA data to help increase the rigor of the course.

Fall 2011 we changed books to help increase the rigor of the course, and then we have made changes over the summer of 2012 to improve the course and a result of the book change.

Fall 2014 we will be changing the book and made adjustments. We also changed the syllabus to reflect only the math outcomes we actually cover in college algebra, not the entire spectrum of outcomes for all math classes for a math major. In the past we listed all math outcomes for a math major and during a general education such as college algebra these are not all covered, but a math major will cover all of the outcomes by the time they have completed the core math classes.

Fall 2015 we added trigonometry topics to the course to be aligned with the state college algebra classes. We also have found that our students tend to lack the trig needed to be successful in future credit bearing classes.

**Budget Justification** (What resources are necessary to improve student learning?)

Since Fall 2008 when the Math Learning Center was established the program has been able to run smoothly. The MLC is an essential part to the success of the program. This has resulted in the addition of a part time IA in the MLC in the evenings and weekends to help our full time day IA. We now are able to offer a professional in the MLC during all the hours it is opened not just during the day time hours.

In Spring 2013 HCC opened the Student Learning Center (SLC). The Math Learning Center, The Science Learning Center and Student Success Center have now been combined into one area which is now the SLC. During the spring 2013 semester we have worked on trying to make the SLC as affective as the MLC has been in the past. We still have many changes to make, but we are headed in the right direction. Some of our problems have been the size of the new facility makes it hard to keep math in one place so the IA's are running all over the room and in turn do not have as much time to spend with students. We have also struggled with the reporting process of the hours students complete in the SLC since it does count towards part of their grade for the course.

Suggestion is to make sure we have enough money in the budget to have Math IA coverage during all hours that the SLC is open. From the first semester reporting over 75% of the time spent in the SLC by students is geared towards math. We also need to make sure there is money in the budget for student workers in the SLC and also in the classroom when students are in a computer lab working on their assignments.

We also need to include CAAP testing fees into the budget to verify the HCC course compared to the National Norm. We will be administering the CAAP exam to several sections in Fall 2015.

**Course: MAT 101****SLOA Data****Faculty Team: P. Kessler**

	FA 13	SP 14	SU 2014	FA 14	SP 15	SU 15	FA 15	SP 16	SU 16	FA 16	SP 17	SU 17	FA 17	SP 18	
Registered	402	446	117	396	446	91	306	375	54	321	375	57	306	375	
# Withdraw	39	33	11	23	30	7	20	12	2	21	15	6	26	18	
% Withdraw	9.7%	7.4%	9.4%	5.8%	6.7%	7.7%	6.5%	4.3%	3.7%	6.1%	4.5%	9.5%	7.8%	4.6%	
# Walk-Away Fs*	45	43	12	43	35	15	35	32	9	30	21	5	29	41	
% Walk- Away Fs*	11.2%	9.6%	10.3 %	10.9%	7.8%	16.5%	11.4%	11.6%	16.7%	8.8%	6.3%	7.9%	8.7%	10.4%	
% Success (A,B,C)	58.5%	61.9%	56.4 %	67.4%	67.9%	59.3%	67.6%	65%	61.1%	70.5%	63.6%	65.1%	78.5%	71.4%	
% General Education SLOA	67.6%	66.6%	56.9 %	67.1%	68.5%	59.5%	69.3%	70.9%	59.4%	67%	67.8%	58.1%	67%	63.6%	
Common SLOA Course Score	23.2** N=269	24.93 N=323	22.79 N=82	23.97 N=311	25.82 N=368	25.63 N=64	26.5 N=241	25.39 N=330	26.43 N=52	26.71 N=268	25.6 N=287	28.13 N=38	26.14 N=259	25.31 N=321	
% Course Score	66.2%	71.2%	65.1	68.5	73.8	73.2	75.7	72.5	75.5	76.3	73.1	80.4	74.7	72.3	
Mean course grade(GPA)	2.09	2.19	2.02	2.22	2.36	2.12	2.3	2.05	2.19	2.46	1.38	2.39	2.29	1.04	

\*% Walk-away Fs = Did not take the final exam and received a grade of F.

\*\* Fall 2013- Present Common SLOA Score out of 35. (SU 09 – SU 13 score was out of 25)

% Gen Ed SLOA Average correct/ 8

% Course Score Average 101 SLOA/35