## Syllabus for MAT 105—College Algebra 3 Credit Hours Summer 2014

### I. COURSE DESCRIPTION

A treatment that develops the concepts of number systems, absolute value, inequality, domain, range, local extremes, zeros, relations, and functions. Functions studied include those that are linear, polynomial, radical, absolute value, exponential, and logarithmic. (Does not count toward a major or minor in mathematics.)

### II. COURSE GOALS

The purpose of this course is to enable the student to be able to develop the background required for the science or mathematics courses required in pre-medicine, computer science, and pre-engineering (as well as other scientific disciplines). College Algebra and Trigonometry provide the prerequisites for the study of calculus.

## III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

## A. Objectives

As a result of successfully completing this course, the student will be able to do the following:

- 1. Identify number sets and apply their basic operations.
- 2. Define function and relation.
- 3. Define and determine the domain and range of a given function.
- 4. Determine symmetries of a graph that relate to the x-axis, y-axis, origin, and the line y = x.
- 5. Identify functions as increasing, decreasing, odd, even, continuous, and discontinuous.
- 6. Graph given functions that are polynomials, exponentials, and logarithmic.
- 7. Construct sum, difference, product, and quotient functions from other functions.
- 8. Discuss the end behavior of a given function.
- 9. Find zeros of polynomial functions through various methods such as graphing, factoring and synthetic division.
- 10. Define composite functions and apply this definition to given functions.
- 11. Define a rational function.
- 12. List the location of the vertical and horizontal asymptotes of a given function.
- 13. Describe the function behavior near asymptotes.
- 14. Define exponential and logarithmic functions.
- 15. List the characteristics of a basic exponential graph.
- 16. List the characteristics of a basic logarithmic graph.
- 17. Discuss the best-fit equation for several regression models.
- B. Objectives for Students in Teacher Preparation Programs The course goals for the Teacher Preparation Program now meet the competency-based requirements established by the Oklahoma Commission on Teacher Preparation. This course meets Subject Competencies 5, 6, 7, 8, and 9.
  - SC5: Has a broad and deep knowledge of the concepts, principles, techniques, and

reasoning methods of mathematics that is used to set curricular goals and shape teaching.

- SC6: Understands significant connections among mathematical ideas and the applications of these ideas to problem solving in mathematics, in other disciplines, and in the world outside of school.
- SC7: Has experiences with practical applications of mathematical ideas and is able to incorporate these in curricular and instructional decisions.
- SC8: Is proficient in, at least, the mathematics content needed to teach the mathematics skills described in Oklahoma's core curriculum, from multiple perspectives. This includes, but is not limited to, a concrete and abstract understanding of number systems and number theory, geometry and measurement, statistics and probability, functions, algebra, discrete mathematics, and calculus necessary to effectively teach the mathematics skills addressed in the sixth through twelfth grade in the Oklahoma core curriculum. (The depth and breadth of knowledge should be much greater than for the Intermediate Mathematics certification.)
- SC9: Is proficient in the use of a variety of instructional strategies to include, but is not limited to, cooperative learning, use of concrete materials, use of technology (i.e., calculators and computers), and writing strategies to stimulate and facilitate student learning.

# IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

- A. Required Materials
  - Textbooks Blitzer, Robert. *College Algebra*. 6<sup>th</sup> ed. Boston: Pearson, 2014. ISBN: 978032178228 (textbook only).

ISBN: 9780321900500 (textbook packaged with MyMathLab).

2. Other

*MyMathLab* is an online software product that allows the student to do homework math problems accompanied with immediate feedback, context sensitive help, examples, multiple tries for each problem, and pages to read from the textbook. The software also contains a grade book and testing features. The Internet site for the course is http://www.coursecompass.com/. The Course-Compass course name is MAT 105 College Algebra. Each student will purchase a *MyMathLab* access key code on the Internet site listed above and join the class using the class code provided on the first day of class. ISBN: 9780321199911 (MyMathLab only)

- 3. A graphing calculator is required. The instructor will be using the TI-84 Plus Silver Edition throughout the course.
- B. Optional Materials
  - 1. Textbooks
  - None
  - 2. Other None

## V. POLICIES AND PROCEDURES

- A. University Policies and Procedures
  - 1. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print,

electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:

- a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
- b. Failing to meet group assignment or project requirements while claiming to have done so;
- c. Failing to cite sources used in a paper;
- d. Creating results for experiments, observations, interviews, or projects that were not done;
- e. Receiving or giving unauthorized help on assignments.

By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

- 2. For online courses, the Final Exam should be taken at a certified testing center.
- B. Department Policies and Procedures

Each student who uses the computer is given access to the appropriate computer resources. These limited resources and privileges are given to allow students to perform course assignments. Abuse of these privileges will result in their curtailment. Students should note that the contents of computer directories are subject to review by instructors and the computer administrative staff.

C. Course Policies and Procedures

a.

1. Evaluation Procedures

The weight distribution of course work is as follows with the final grade based on performance in four categories:

Homework	55%
Chapter Exams and Quizzes	20%
Comprehensive Final Exam	25%

- 2. Whole Person Assessment Requirements None
- 3. Other Policies and/or Procedures
  - Homework and programming problems will be assigned via MyMathLab. Completing the homework is essential. Because mathematics builds upon previously developed concepts, your progress in the learning process depends upon proper pacing. The best way to ensure maximum learning is for each student to give immediate attention to each assignment presented. Homework assignments are given in Part VI of this syllabus.
  - b. All ORU students are expected to take one college-level mathematics course. If the material in this course along with the material in Trigonometry (MAT 106) was studied in high school, the student is expected to take Calculus I (MAT 201).

VI. COURSE CALENDAR: For 7 week online courses, it is recommended that the student complete a minimum of 6 sections a week.

Chapter P: Prerequisites: Fundamental Concepts of Algebra 1

- P.1 Algebraic Expressions, Mathematical Models, and Real Numbers
- P.2 Exponents and Scientific Notation
- P.3 Radicals and Rational Exponents
- P.4 Polynomials
- P.5 Factoring Polynomials
- P.6 Rational Expressions
- Chapter 1: Equations and Inequalities
  - 1.1 Graphs and Graphing Utilities
  - 1.2 Linear Equations and Rational Equations
  - 1.3 Models and Applications
  - 1.4 Complex Numbers
  - 1.5 Quadratic Equations
  - 1.6 Other Types of Equations
  - 1.7 Linear Inequalities and Absolute Value Inequalities
    - TEST (Chapter 1)

### Chapter 2: Functions and Graphs

- 2.1 Basics of Functions and Their Graphs
- 2.2 More on Functions and Their Graphs
- 2.3 Linear Functions and Slope
- 2.4 More on Slope
- 2.5 Transformations of Functions
- 2.6 Combinations of Functions; Composite Functions
- 2.7 Inverse Functions
- 2.8 Distance and Midpoint Formulas; Circles
  - TEST (Chapter 2)

Chapter 3: Polynomial and Rational Functions

- 3.1 Quadratic Functions
- 3.2 Polynomial Functions and Their Graphs
- 3.3 Dividing Polynomials; Remainder and Factor Theorems
- 3.4 Zeros of Polynomial Functions
- 3.5 Rational Functions and Their Graphs
- 3.6 Polynomial and Rational Inequalities
- 3.7 Modeling Using Variation
  - TEST (Chapter 3)

### Chapter 4: Exponential and Logarithmic Functions

- 4.1 Exponential Functions
- 4.2 Logarithmic Functions
- 4.3 Properties of Logarithms
- 4.4 Exponential and Logarithmic Equations
- 4.5 Exponential Growth and Decay; Modeling Data

TEST (Chapter 4)

# Course Inventory for ORU's Student Learning Outcomes MAT 105—College Algebra Fall 2013

This course contributes to the ORU student learning outcomes as indicated below: **Significant Contribution** – Addresses the outcome directly and includes targeted assessment. **Moderate Contribution** – Addresses the outcome directly or indirectly and includes some assessment. **Minimal Contribution** – Addresses the outcome indirectly and includes little or no assessment. **No Contribution** – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

	OUTCOMES & Proficiencies/Canacities	Significant	Moderate	Minimal	No
	OUTCOMES & ITOHCIENCIES/Capacities	Contribution	Contribution	Contribution	Contribution
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1	Outcome #1 – Spiritually Alive Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit			Х	
1C	Evangelistic capability				X
1D	Ethical behavior			X	
2	Outcome #2 – Intellectually Alert Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy			X	
2C	Global & historical perspectives			X	
2D	Aesthetic appreciation				X
2E	Intellectual creativity	X			
3	Outcome #3 – Physically Disciplined Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				Х
4	Outcome #4 – Socially Adept Proficiencies/Capacities				
4A	Communication skills		X		
4B	Interpersonal skills		X		
4C	Appreciation of cultural & linguistic differences				X

Responsible citizenship

Leadership capacity

4D

4E

Х

Х