WvEB College Algebra: Fall 2016 and Spring 2017
3 credits
FINAL: **No later than Friday, December 9 for Fall 2016**
No later than Monday, May 1 for Spring 2017

INSTRUCTOR: Dr. Laura J. Pyzdrowski	OFFICE: 411 Armstrong Hall, WVU-Morgantown
PHONE: 293-2011 ext. 2358 EMAIL: lpyzdrow@math.wvu.edu	PREREQUISITES: Placement test [or Math ACT 25 (only with consent)]
TEXT: Sullivan: College Algebra and Trigonometry: Enhanced with Graphing Utilities, (WVU)5th edition. Upper Saddle River, NJ, Prentice -Hall. ISBN: 126919884X Important Withdrawal Dates for the Fall Semester: Oct. 26th to drop selectively, December 5th to withdraw from all classes. Important Withdrawal Dates for the Semester: March 24th to drop selectively, April 28th to withdraw from all classes.	LAB MANUAL: College Algebra Study Guide and Interactive Labs: Butler, Mays, Pyzdrowski & Pyzdrowski, available through WVU Bookstore ISBN 10: 126937513X or your school CD: WvEB Algebra, Pyzdrowski - available through your school;

- **You must work with a laboratory partner in your school to receive full participation points on the lab**.
- **Labs with a late check-in will have a 10% deduction, labs are due prior to the test on which the lab appears.**
- **Either a scientific or graphing calculator is required for the course. Only those calculators permitted for use on the ACT test are permitted. Please see your instructor if you have questions.**

Objectives: The general goals of this course are common to all the courses in the Institute for Math Learning at WVU:

- CONCEPTUAL UNDERSTANDING: rather than just rote memorization of algorithms
- MULTIPLE APPROACHES: to examine problems from analytical, geometric and numeric perspectives, to make judgements about the appropriateness of the choice of formal or approximate methods of solution
- TECHNOLOGY AS A TOOL: use technology as an integral part of the process of formulation, solution, and communication, to gain experience in selecting the proper tool for a given problem
- ACTIVE STUDENT LEARNING: to engage in the exploration and discovery of concepts and to learn to work cooperatively to solve problems
- COMMUNICATION OF IDEAS: to demonstrate understanding by explaining in written or oral form the meanings and applications of concepts
- PROBLEM SOLVING: gain experience as a problem solver, to analyze problems in an organized manner
- APPLICATIONS: use mathematics to model and solve problems

The specific goals of the college algebra course - students will be able to:
- understand and use the concept of a function
- solve mathematical application problems by connecting mathematical results to contextual meanings
- solve equations and inequalities in one variable using multiple representations
- graph equations and functions and relate graphical features to related algebraic and numeric features
- use and compare algebraic, graphical, and numerical approaches to solve problems involving lines, parabolas, circles, systems of equations and matrices
- use and compare algebraic, graphical, and numerical approaches to solve problems involving, functions (including higher order polynomial, rational, radical, absolute value, exponential and logarithmic).

To accomplish course goals, the class incorporates interactive laboratories which use technology and student activities that emphasize writing and student collaboration. Students will work in triads on the laboratories in order to
 develop mathematical communication skills. The development of your communication skills is an integral part of the course.

Evaluation: Multiple forms of assessment will be used to measure your understanding of algebraic concepts and problem solving. The point distribution of these assessments is:

Assessment	Number	Maximum Points Awarded
Exams : There will be four tests given throughout the semester; each is worth 100 points. **All exams** are individual assessments and are to be proctored. They are closed book and closed note. No formula sheets, computer screens other than the test, notes on paper, or notes on calculator are permitted. No internet searches nor use of cell phones is permitted during exams.	4	400
Comprehensive Final Exam: A comprehensive final worth 200 points	1	200
Laboratory Assignments: There will be 8 computer laboratory assignments. The laboratory scores will be averaged. You will be awarded laboratory points that are 2 times your laboratory average. Laboratory assignments should be done with a partner. Some points are awarded for the ability to communicate about mathematics. Any laboratories not submitted as a team effort, will not be awarded communication points.	8	200
Quizzes: There will be 6 online homework quizzes and two ACT quizzes. The online homework quizzes are immediately graded and will be averaged for a possible 100 points. Homework Quizzes are open book and open notes, but must be done without help of your high school teacher-facilitator. You may attempt each HQ up to three times. You must complete at least one of each HQ before the test which includes the HQ sections. The HQ portion of the course will be "turned off" by 5:00 pm server time, December 6, 2016 and April 28, 2017.	6	100
Each ACT Quiz can allow you to earn bonus course points: $1\leq$ number correct ≤21, earn 1 bonus point $40\leq$ number correct ≤41, earn 6 bonus point $22\leq$ number correct ≤28, earn 2 bonus point $42\leq$ number correct ≤44, earn 7 bonus point $29\leq$ number correct ≤31, earn 3 bonus point $45\leq$ number correct ≤47, earn 8 bonus point $32\leq$ number correct ≤34, earn 4 bonus point $48\leq$ number correct ≤49, earn 9 bonus point $35\leq$ number correct ≤39, earn 5 bonus point $50\leq$ number correct ≤60, earn 10 bonus point	2	20
Participation: You will be awarded up to 100 participation points for the course. Each individual course facilitator will determine how 70 these points are awarded for any combination of points from attendance, homework, portfolio, notebook, or other school requirement. The remaining 30 points will come from specific course requirements that will be communicated to you as the course progresses. These additional participation requirements are educational in nature and in some cases are intended to help you reflect about yourself as a learner and to provide formative information to the course instructor regarding the course structure and components.	Will Vary	100

Grade: points ≥900 A, 900 > points ≥800 B, 800 > points ≥700 C, 700 > points ≥600 D,   points < 600 : Fail

Inclusivity Statement: The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see http://diversity.wvu.edu.

Academic Integrity: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code: http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Help: On an average, you should expect to study two hours outside of class for each one hour in class. If you are spending more, then you may need to seek help! There are several excellent sources for such help. First, seek help from your classmates; use the WEBCT discussion group to get help or set up a study group. Often classmates can explain the problem clearly since they have been working on it. You may also seek assistance from your facilitator.

<div class="column-left">

UNIT 1 (Weeks 1 - 4)
Pre-ACT, Review and Solving Equations

Pre-ACT Test

U1.1	*Section*	R.1 - R.3
	Lecture	• Number Systems and Sets of Numbers
		• Interval Notation
		• Integer Exponents
		• Radicals (The Square Root)

U1.2	*Section*	R.4 - R.5
	Lecture	• Polynomials
		• Factoring Polynomials

U1.3	*Section*	R.7 - R.8
	Lecture	• Rational Expressions
		• Expressions with Radicals
		• Expressions with Rational Exponents
	Quiz 1	R.1 - R..5, R.7 - R.8

U1.4	*Section*	1.1
	Lecture	• Graphing Basics
		• Distance and Midpoints

U1.5	*Section*	1.2
	Lecture	• Equations: Linear and Rational
		• Linear Applications

U1.6	*Section*	1.3, 1.5
	Lecture	• Quadratic Equations
		• Quadratic Formula and Discriminant
		• Quadratic Applications
		• Other Types of Equations
		• Absolute Value Equations
		• Other Applications
	Lab	Introduction and Basic Graphs
	Quiz 2	1.1-1.3, 1.5
	Test 1	R.1 - R.5, R.7 - R.8 , 1.1-1.3, 1.5 (Week 4)

UNIT 2 (Weeks 4 - 7)
Inequalities, Lines and Circles, and Introduction to Functions

U2.1	*Section*	1.7
	Lectures	• Interval Notation Review with Inequalities
		• Solving Inequalities
		• Absolute Value with Inequalities

U2.2	*Section*	2.1
	Lecture	• Complete Graphs
		• Symmetry
	Lab	Graphing Techniques

U2.3	*Section*	2.2 - 2.3
	Lecture	• Lines
		• Parallel and Perpendicular Lines
		• Circles

U2.4	*Section*	3.1 - 3.4
	Lecture	• Functions and the Vertical Line Test
		• Domains of Functions
		• Operations on Functions
		• Difference Quotient
		• Reading Graphs of Functions
		• Even and Odd Functions
		• More on Functions
		• Average Rate of Change
		• Basic and Piecewise Functions
		• Composition of Functions
	Lab	The Box Problem

</div>

<div class="column-right">

Quiz 3	1.7, 2.1 - 2.3, 3.1 - 3.4	
Test 2	1.7, 2.1 - 2.3, 3.1 - 3.4 (Week 7)	

UNIT 3 (Weeks 7 - 10)
Operations on Functions, Quadratic Functions and Polynomial Functions

U3.1	*Section*	6.1, 3.5 - 3.6
	Lecture	• Composition of Functions
		• Graphing Techniques
		• Mathematical Models

U3.2	*Section*	4.3, 4.4, 1.4
	Lecture	• Quadratic Functions
		• More on Quadratic Functions
		• Complex Numbers
		• Power Functions
	Lab	Quadratic Functions

U3.3	*Section*	5.1, R.6
	Lecture	• Polynomial Functions
		• Synthetic Division
	Lab	Polynomial Functions
	Quiz 4	3.5 - 3.6, 6.1, 4.3 - 4.4, 5.1, 1.4, R.6
	Test 3	3.5 - 3.6, 6.1, 4.3 - 4.4, 5.1, 1.4, R.6 (Week 10)

UNIT 4 (Weeks 10 - 13)
Rational Functions and Exponential Functions

U4.1	*Section*	5.2 - 5.3
	Lecture	• Rational
		• Improper Rational Functions
	Lab	Rational Functions

U4.2	*Section*	5.5 - 5.6
	Lecture	• Real Zeros of Polynomials
		• Intermediate Value Theorem and the Fundamental Theorem of Algebra

U4.3	*Section*	6.2 - 6.3
	Lecture	• One to One and Inverse Functions
		• Exponential Functions
	Lab	Exponential Functions
	Quiz 5	5.2 - 5.3, 5.5 - 5.6, 6.2 - 6.3
	Test 4	5.2 - 5.3, 5.5 - 5.6, 6.2 - 6.3 (Week 13)

UNIT 5 (Weeks 13 - 15)
Logarithmic Functions and Systems of Equations

U5.1	*Section*	6.4 - 6.6
	Lecture	• Logarithms
		• Properties of Logarithms
		• Solving Logarithmic and Exponential Equations
	Lab	Logarithmic Functions

U5.2	*Section*	6.7 - 6.8
	Lecture	• Compound Interest
		• Growth and Decay

U5.3	*Section*	12.1 - 12.2
	Lecture	• Systems of Equations
		• Matricies
	Quiz 6	6.4 - 6.8, 12.1 - 12.2

FINAL

Comprehensive Final (Week 15 or 16)
Post-ACT Test

</div>

Homework Assignments for College Algebra 2015-2016

Section	Name	Problem Numbers
R.1	Real Numbers	1, 21, 23, 25, 27, 33, 35, 39, 41, 45, 51, 57, 59, 65, 69, 75, 81, 87, 91, 93
R.2	Algebra Essentials	4, 11, 15, 23, 24, 31, 37, 41, 45, 47, 49, 57, 59, 61, 65, 73, 74, 75, 76, 77, 87, 89, 93, 95, 141
R.3	Geometry Essentials	11, 21, 25, 27, 29, 31, 37, 39
R.4	Polynomials	7, 9, 17, 21, 29, 31, 34, 39, 47, 55, 69, 93, 97
R.5	Factoring Polynomials	5, 13, 17, 25, 33, 39, 45, 51, 57, 61, 65, 85, 91, 95, 105, 107, 121
R.6	Synthetic Division	5, 9, 17
R.7	Rational Expressions	5, 13, 19, 25, 31, 47, 53, 63, 73
R.8	*n*th Roots; Rational Exponents	1, 2, 7, 15, 17, 21, 23, 31, 43, 47, 55, 63, 71, 75
1.1	Rectangular Coordinates; Graphing Utilities; Introduction to Graphing Equations	5, 7, 9, 13, 33, 39, 49, 57, 64, 75, 77, 79, 83, 95, 105
1.2	Solving Equations Using a Graphing Utility; Linear and Rational Equations	41, 43, 45, 51, 53, 55, 61, 71, 77, 89, 95, 99, 101, 105, 107, 109
1.3	Quadratic Equations	5, 6, 13, 15, 17, 23, 25, 37, 39, 41, 45, 49, 51, 63, 67, 79, 83, 97, 99, 105
1.4	Complex Numbers; Quadratic Equations in Complex Number System	9, 13, 19, 26, 27, 31, 33, 35, 49, 51, 53, 59, 73, 79
1.5	Radical Equations; Equations in Quadratic Form, Absolute Value Equations; Factorable Equations	11, 15, 23, 25, 31, 35, 51, 57, 61, 67, 69, 86, 89, 116
1.7	Solving Inequalities	11, 12, 14, 23, 27, 31, 35, 47, 49, 59, 65, 69, 71, 73, 77, 79, 83, 107, 109
2.1	Intercepts, Symmetry; Graphing Key Equations	13, 21, 27, 31, 39, 41, 45, 51, 69, 71
2.2	Lines	13, 17, 27, 29, 31, 41, 43, 45, 59, 65, 77, 83, 85, 97, 121, 127, 128
2.3	Circles	6, 9, 11, 17, 23, 27, 31, 32, 37, 39, 43
3.1	Functions	15, 19, 27, 33, 39, 41, 53, 55, 57, 61, 65, 73, 75, 93, 104
3.2	The Graph of a Function	9, 13, 15, 23, 25, 39
3.3	Properties of Functions	11, 13, 15, 17, 19, 21, 29, 33, 53, 59, 69, 73, 75
3.4	Library of Functions: Piecewise-defined Functions	9, 10, 11, 12, 13, 14, 15, 16, 25, 29, 35, 41, 43, 47
3.5	Graphing Techniques: Transformations	7, 9, 11, 13, 15, 17, 19, 27, 31, 41, 45, 63, 69
3.6	Math Models: Building Functions	2, 3, 5, 6, 7, 21, 23, 25, 26
4.3	Quadratic Functions and Their Properties	11, 13, 15, 17, 27, 37, 41, 43, 49, 83
4.4	Building Quadratic Models from Verbal Descriptions and from Data	3, 7, 8, 9, 11, 15
5.1	Polynomial Functions and Models	11, 15, 23, 25, 32, 37, 43, 55, 61, 69, 71, 79, 91
5.2	Properties of Rational Functions	13, 23, 25, 31, 41, 45, 51
5.3	The Graph of a Rational Function	7, 15, 27, 33, 35, 51, 61
5.5	The Real Zeros of a Polynomial Function	11, 13, 21, 27, 39, 43, 63, 73
5.6	Complex Zeros, Fundamental Theorem of Algebra	7, 9, 17, 23, 33
6.1	Composite Functions	7, 9, 11, 19, 47, 53, 65, 71
6.2	One-to-one functions; Inverse functions	11, 15, 19, 21, 35, 43, 50, 63, 65, 90
6.3	Exponential Functions	15, 21, 22, 23, 25, 27, 29, 31, 33, 35, 38, 49, 59, 63, 77, 81, 97, 121
6.4	Logarithmic Functions	13, 15, 19, 23, 31, 37, 57, 63, 70, 73, 79, 81, 87, 97
6.5	Properties of Logarithmic Functions	2, 13, 15, 23, 27, 41, 49, 51, 53, 61, 63, 65, 69, 75, 76, 85
6.6	Logarithmic and Exponential Equations	11, 15, 25, 37, 43, 47, 51, 81
6.7	Financial Models	7, 15, 29, 35, 41, 45, 54
6.8	Exponential Growth and Decay	1, 3, 7, 9,11
12.1	Systems of Linear Equations: Substitution and Elimination	7, 11, 19, 23, 25, 29, 41, 55
12.2	Systems of Linear Equations: Matrices	5, 11, 17, 39, 41, 51