

WvEB College Algebra: Fall 2010 and Spring 2011  
3 credits

**FINAL: No later than December 13 for Fall 2010**  
**No later than May 2 for Spring 2011**

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TEXT: Sullivan : Algebra and Trigonometry, 5th edition. Upper Saddle River, NJ, Prentice -Hall. Special WVU Edition	Lab Manual: Pyzdrowski 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.**
- **Late labs will have a 10% deduction for each week that it is late after the test on which the lab appears.**

**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 this course will be to stress an algebraic, graphic, and numeric approach to the study of:

- understanding and using the concept of function
- mathematical application problems
- solving equations and inequalities in one variable using multiple representations
- graphing equations and functions
- lines, parabolas, and circles
- higher order polynomial, rational, radical, absolute value, exponential and logarithmic functions
- systems of equations and matrices

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 pairs or 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. <b>All exams</b> are individual assessments and are to be proctored. They are closed book and closed note. No formula sheets, computer screens other than the test, or notes (paper, nor calculator) are permitted.	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 12, 2010 and May 1, 2011.  Each ACT Quiz can allow you to earn bonus course points:	6	100
$1 \leq \text{number correct} \leq 21$ , earn 1 bonus point $40 \leq \text{number correct} \leq 41$ , earn 6 bonus point $22 \leq \text{number correct} \leq 28$ , earn 2 bonus point $42 \leq \text{number correct} \leq 44$ , earn 7 bonus point $29 \leq \text{number correct} \leq 31$ , earn 3 bonus point $45 \leq \text{number correct} \leq 47$ , earn 8 bonus point $32 \leq \text{number correct} \leq 34$ , earn 4 bonus point $48 \leq \text{number correct} \leq 49$ , earn 9 bonus point $35 \leq \text{number correct} \leq 39$ , earn 5 bonus point $50 \leq \text{number correct} \leq 60$ , 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 these points are awarded for any combination of points from attendance, homework, portfolio, notebook, or other school requirement.	Will Vary	100

Grade: points  $\geq 900$  A,  $900 > \text{points} \geq 800$  B,  $800 > \text{points} \geq 700$  C,  $700 > \text{points} \geq 600$  D, points  $< 600$  : Fail

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. 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 Disability Services (293-6700).

This course has been certified as part of WVU's Liberal Studies Program, Math and Natural Sciences (cluster C). The course will focus in part on developing your ability to communicate effectively, understand alternative views and cultures, and use quantitative and scientific knowledge accurately.

**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.

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

Pre-ACT Test

U1.1	<i>Section</i>	R.1 - R.3
	<i>Lecture</i>	Review 1
U1.2	<i>Section</i>	R.4 - R.5
	<i>Lecture</i>	Review 2
U1.3	<i>Section</i>	R.7 - R.8
	<i>Lecture</i>	Review 3
	<i>Quiz 1</i>	R.1 - R..5, R.7 - R.8
U1.4	<i>Section</i>	1.1
	<i>Lecture</i>	Distance, Midpoints, and Graphs of Equations
U1.5	<i>Section</i>	1.2
	<i>Lecture</i>	Equations and Applications
U1.6	<i>Section</i>	1.3, 1.5
	<i>Lecture</i>	Quadratic and Other Types of Equations
	<i>Lab</i>	Introduction and Basic Graphs
	<i>Quiz 2</i>	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	<i>Section</i>	1.7
	<i>Lectures</i>	Inequality Review 1 & Inequality Review 2
U2.2	<i>Section</i>	2.1
	<i>Lecture</i>	Review: Distance, Midpoints, and Graphs of Equations
	<i>Lab</i>	Graphing Techniques
U2.3	<i>Section</i>	2.2 - 2.3
	<i>Lecture</i>	Lines
U2.4	<i>Section</i>	3.1 - 3.4
	<i>Lecture</i>	Functions
	<i>Lab</i>	The Box Problem
	<i>Quiz 3</i>	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	<i>Section</i>	3.5 - 3.6, 6.1
	<i>Lecture</i>	Graphing Techniques and Operations on Functions
U3.2	<i>Section</i>	4.3, 4.4, 1.4
	<i>Lecture</i>	Quadratic Functions and Negative Discriminants
	<i>Lab</i>	Quadratic Functions

U3.3	<i>Section</i>	5.1, R.6
	<i>Lecture</i>	Polynomial Functions and Synthetic Division
	<i>Lab</i>	Polynomial Functions
	<i>Quiz 4</i>	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, 5.1, 1.4, R.6 (Week 10)

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

U4.1	<i>Section</i>	5.2 - 5.3
	<i>Lecture</i>	Rational Functions
	<i>Lab</i>	Rational Functions
U4.2	<i>Section</i>	5.5 - 5.6
	<i>Lecture</i>	Real Zeros and the Fundamental Theorem of Algebra
U4.3	<i>Section</i>	6.2 - 6.3
	<i>Lecture</i>	One to One, Inverse, and Exponential Functions
	<i>Lab</i>	Exponential Functions
	<i>Quiz 5</i>	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	<i>Section</i>	6.4 - 6.6
	<i>Lecture</i>	Logarithms
	<i>Lab</i>	Logarithmic Functions
U5.2	<i>Section</i>	6.7 - 6.8
	<i>Lecture</i>	Compound Interest Growth and Decay
U5.3	<i>Section</i>	12.1 - 12.2
	<i>Lecture</i>	Systems of Equations
	<i>Quiz 6</i>	6.4 - 6.8, 12.1 - 12.2

**FINAL**

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

## Homework Assignments for College Algebra 2010-2011

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