

<b>Instructor:</b>	D.P. Adhikari	<b>Class Hours:</b>	MWF: 2:30-3:20 PM
<b>Office:</b>	MS 413	<b>Classroom:</b>	ES 412
<b>Office Hours:</b>	TWF: 9:30-10:20am		
<b>Telephone:</b>	405-744-7220		
<b>e-mail:</b>	<a href="mailto:dadhika@math.okstate.edu">dadhika@math.okstate.edu</a>		
<b>Course Web Page:</b>	Course information is available at: <a href="http://www.math.okstate.edu/~dadhika">www.math.okstate.edu/~dadhika</a>		

**Syllabus Attachment.** OSU has compiled useful information that applies to all classes at <http://osu.okstate.edu/acadaffr/aa/syllabusattachment-Fall.htm>

This website includes add/drop/withdrawal dates, university holidays, accommodations for students with disabilities, academic resources, and much more. You are responsible for reading this information now and having any questions answered.

**Introduction.** Most of you have studied some level of algebra in your high school mathematics courses - probably Algebra I and Algebra II. In the process of learning lots of rules for manipulating symbols, did you ever stop to ask yourself - or anyone else - questions like "What IS Algebra?" "Where did the word 'algebra' come from?" "What good is algebra?" "Where will I ever use it?" Thinking about these questions is a good place to begin our study of College Algebra.

It is believed that the word "algebra" had its origin in the work of the Arabian mathematician, *Mohammed ibn Musa Abu Djefar Al-Khwarizmi*. His work holds an important place in the history of mathematics; through it the Arabic or Indian system of decimal numeration was introduced into Western culture. The work is named *Al-gebr we' l mukabala: al-gebr*, from which the word "algebra" is derived. *Al-gebr* refers to the fact that the same magnitude may be added to or subtracted from both sides of an equation; *al mukabala* means the process of simplification and is generally used in connection with the combination of like terms into a single term. Because "algebra" involves operations on sets of numbers that are often represented by symbols, it is regarded as the *language of mathematics*. Being well-grounded in algebra will enable you to continue your study of mathematics in a meaningful and successful manner.

So, what is College Algebra and how does it differ from the algebra courses I studied in high school? Good question! In high school algebra, you were primarily concerned with learning to use the rudiments of algebra - skills, procedures, and manipulations; you were developing "language skills" in mathematics. In College Algebra, we are concerned with building on these skills as they apply to functions and real world applications. College Algebra can be thought of as "the study of functions." One of the goals of this course is that you appreciate functions and the role they play in mathematics.

In this course, we will build upon your previous studies in algebra; throughout, I have given great attention to reinforcing what you have already learned with what is new. This is exciting - you are growing mathematically! We begin by studying some familiar functions - linear and quadratic - and then move on to some very special functions - polynomial, rational, exponential, and logarithmic. On our journey, we will explore applications of these functions in the world around us. In the final portion of the course, we will study systems of equations and conic sections and see how these mathematical notions are applied.

**This study of College Algebra involves the use of technology** - namely, the graphing calculator; it has been carefully integrated into the delivery throughout. Technology can be a tremendous aid in learning mathematics only if it is used *appropriately*. Technology is not a "quick fix" to learning functions or any mathematics! Because of the importance of technology today, a goal of the course is that you are comfortable with it and that you know when it is

*appropriate* to choose it in learning mathematics. I think you will find technology is a great asset in learning mathematics.

**This study of College Algebra involves reading mathematics for meaning and modeling mathematical applications.** Among the academic deficiencies regularly observed by instructors of entry level mathematics courses are the problems that students have with (1) dealing with mathematical problems presented in prose style, i.e., reading mathematical statements for meaning, (2) modeling mathematical applications geometrically and algebraically, and (3) communicating their results in writing. We have written specially designed on line materials to help you read and model mathematical problems. The name of our project is **Reading and Modeling Mathematical Problems**, or simply **RaMMP**. The purpose of the RaMMP materials is to contribute directly to improving your critical thinking skills for reading applied mathematical problems in prose form, developing mathematical models, and drawing conclusions. The RaMMP materials are on line at the website

<http://www.math.okstate.edu/~aichele/RaMMP/rammp.html>

Once you are at this location, you should study

Part I - How to Read Mathematics for Meaning -- Making Sense of Mathematical Prose and, Part III - Appendix 1: How to Study Math - Improving Your Critical Thinking Skills.

**Course Prerequisites.** I assume you have completed the second course in the high school algebra curriculum, Algebra II, or Intermediate Algebra (MATH 0123). Further, I assume some minimal familiarity with a graphing calculator such as the Texas Instruments TI-83.

**Course Objectives.** To learn college-level algebra as discussed above; to complete the college mathematics requirements for further study of mathematics and of mathematically-dependent subjects.

#### **Required Textbook Package and Supplies.**

- **Textbook Package.** You are required to have the textbook package for the course which consists of the textbook *College Algebra - Graphs and Models (4th edition)* by M. Bittinger, J. Beecher, D. Ellenbogen, and J. Penna. Addison Wesley Longman, Inc. , 2009 and the manual *Graphing Calculator Manual* by J. Penna, 2009.
- **Graphing Calculator.** You are required to have a graphing calculator for this course. I will be using a TI-83 Plus graphing calculator for some class demonstrations. You may check out a TI-83/TI-83 Plus graphing calculator from the Mathematics Department (401 MS) for use during the semester while the supply lasts; there is NO charge.

**Course Evaluation.** There will be a total of 600 points possible in this course, distributed among homework, homework quizzes, hourly exams, and the final exam as shown below. Notice that the final exam score counts twice; thus, it actually contributes 200 points to your grade. Participation and attendance can also help your grade.

Course grades will be determined according to the following distribution.

Homework	100 points
Examination 1	100 points
Examination 2	100 points
Examination 3	100 points
Final Examination	100 points
Final Examination	100 points
	-----
TOTAL	600 points

Letter grades will be assigned according to the following scale.

540 - 600 points	A
480 - 539 points	B
420 - 479 points	C
360 - 419 points	D
0 - 359 points	F

- Notes.**
1. Final grades will not be curved.
  2. Your class attendance record will be reported along with your course grade.
  3. *At the end of the semester*, your Attendance/Participation Score (100 points maximum) will be used to replace any one of the three (3) examination scores or one of the two (2) Final Examination scores provided it improves your letter grade *and* you earned at least one passing grade on these assessments. The Attendance Score will not be used to replace a homework score.

**Examinations.** There will be three (3) fifty-minute examinations with a maximum possible score of 100 points each and a 100 point comprehensive final examination which will be recorded twice. *Make-up examinations* will be given only for very **serious and unavoidable** conflicts, and *only if* your request to present a make-up examination is approved by your instructor **in advance**. If this condition is not satisfied, it is understood that the opportunity to present a make-up examination is voided. In the instance that a make-up examination is appropriate, it will be given the last day of Finals Week during the period scheduled for make-up exams. Bring your student ID to each examination.

**Exam Dates.** Our exams will be held on the following dates; mark your calendar NOW!. I will announce which sections they cover at least two class periods in advance.

**Exam 1: Wednesday, Sept 22**

**Exam 2: Wednesday, Oct 27**

**Exam 3: Wednesday, Dec 1**

**Final Exam: Wednesday, Dec 15, 2:00-3:50 pm in ES 412**

**Homework Grade.** All homework will be collected and selected problems will be graded. Homework must be turned in during class on the date it is due; you must be present for the entire class session to turn in homework. The staff in the mathematics office has been instructed not to accept homework papers. NO LATE HOMEWORK WILL BE ACCEPTED BY THE INSTRUCTOR. There is a total of 110 points possible on the eleven (11) homework assignments; however, your homework grade will not exceed 100 points.

Homework assignments must be submitted in the following manner:

1. Your name will be prominently displayed on each page.
2. Textbook page and problem numbers will be prominently displayed.
3. Problems will be submitted in the order in which they were assigned.
4. The pages will be stapled together.
5. You must show all work to receive credit.

If these conditions are not met, your work will not be evaluated; it will be returned to you with the assigned grade of 0.

**MLRC: Mathematics Learning Resource Center** - The MLRC is an invaluable resource to support your mathematical learning. They are located on the 4<sup>th</sup> floor of the Classroom

Building (420 CLB, 405-744-5818). For more information, visit the MLRC website at [www.math.okstate.edu/mlrc](http://www.math.okstate.edu/mlrc), or call 405-744-5818 or 405-744-5688.

**Attendance/Class Participation Score.** Daily attendance is critically important. It is difficult, and sometimes impossible, to succeed in a college course without regular attendance. To encourage good habits, I will allow attendance, participation, and MLRC participation to improve your grade. Based on how often you attend and participate in class and on how often you get help in the MLRC, you will be assigned an "Attendance/Participation Score." Throughout the semester, you may earn an Attendance/Participation Score of up to 100 points. This optional score is a privilege that allows students who put forth good effort to improve their grade directly. Keep in mind that satisfying these conditions is also critical to your overall success in the class; without these efforts, you are much less likely to be successful in the course, independent of this extra grade opportunity.

The 100 possible total points of the Attendance/Participation Score are split into two categories:

1. **Class Attendance and Participation (40 points maximum):** At least once per day, I will take attendance in some way. For each absence, 4 points will be deducted from the maximum of 40. You must be in class for the entire class session to be counted as present. You also must actively participate in class; otherwise, you may lose up to 4 points per day. Since this attendance score can only help your semester grade, absences will not be excused for any reason.
2. **MLRC Participation (60 points maximum):** In addition to participating in class daily, you can also earn points by using the free resources at the Mathematics Learning Resource Center (MLRC). You may earn up to 60 points in the following ways:
  - 2 MLRC Points for each 30-59 minutes spent at the MLRC in one sitting.
  - 4 MLRC Points for each 60+ minutes spent at the MLRC in one sitting.
  - You may earn up to a 4 MLRC Points on any particular day. You may, of course, visit the MLRC as much as you would like in a day, but you are limited to earning 4 MLRC Points on that day.

The first and last day that you can earn points will be announced in class. The MLRC will keep a record of your MLRC Points and will report your score to me. **To ensure that your points are recorded each time that you go to the MLRC, make sure that you check in with your OSU Student ID and identify yourself as a College Algebra student.** I also encourage you to keep a log of the dates and times that you visited for your own reference. MLRC Points will not be recorded if you check into the MLRC during the time your class meets.

**The first time you go to the MLRC:**

- Bring your O-Key Account Username (log in at [okey.okstate.edu](http://okey.okstate.edu) to find it) and your OSU Student ID Card to the MLRC check-in (420 CLB).
- Be sure you know the COURSE AND SECTION in which you are enrolled.

**Every time you go to the MLRC:** Check in with your OSU Student ID Card.

**A schedule of the times when the MLRC is open this semester will be distributed in class.**

*At the end of the semester, your Attendance/Participation Score (100 points maximum) will be used to replace any one of the three (3) examination scores or one of the two (2) Final*

Examination scores provided it improves your letter grade *and* you earned at least one passing grade on these assessments. The Attendance Score will not be used to replace a homework score.

More on Class Attendance. Class attendance involving active participation is a very important element in your success in learning college algebra. **YOU ARE EXPECTED TO ACTIVELY PARTICIPATE IN EACH CLASS SESSION.** The Class Attendance Score (40 points maximum) is achieved by your regular attendance at class sessions. Experience has shown a definite correlation between good class attendance and good grades. Your Class Attendance Score is determined by your total number of absences during class sessions. Attendance will be taken during each class session; you must be present for the entire class session in order to be counted as present. For each absence, 4 points will be deducted from the maximum of 40 points. Note. Signing the class Attendance Sheet for another student is not permitted; if it is determined that a student signed in for another student, this unethical conduct will be regarded as a violation of Academic Integrity and the appropriate University policies will be employed. Of course, you won't get anything out of the class if you are there physically but not mentally or if you are unprepared. If you do not actively participate in the class activities, your attendance/participation grade will suffer, even if you have few or no unexcused absences. In addition, if you have not completed the necessary preparation for class, you will lose attendance points. Simply showing up to class is not enough.

Because of the value I place on our class sessions as active learning opportunities, I ask that you assume responsibility for being physically present no later than time the class is scheduled to start, e.g., 8:30 am. If you do miss a class session, you are responsible for finding out what you missed from a classmate, including any announcements and notes from class discussions. I also realize that you may have a class that follows this one; I will dismiss each class session promptly at time the class is scheduled to end, e.g., 9:20 am.

**Drop and Withdrawal Policy (General University Policy 2-0206).** "Dropping" means withdrawing from a specific course while "withdrawal" means withdrawing *from all courses* and leaving the University for the balance of the term. The drop and withdrawal dates are noted on the attached calendar. **IT IS YOUR RESPONSIBILITY TO KNOW AND COMPLY WITH ALL DEADLINES.** Reasons similar to those listed below will NOT result in approval for dropping a course after the deadline (from OSU Policy 4.03):

- a. Student's lack of knowledge or misunderstanding of the deadline.
- b. Student waited to get the results of an exam or other assignment.
- c. Student's grades have declined since the deadline.
- d. Student doesn't need the course for graduation.
- e. Different deadlines existed at a previous school.

**Incomplete Grade.** The grade of "I" is given to students who satisfactorily completed the majority of the course work and whose work averages "D" or better, but who have been **unavoidably** prevented from completing the remaining work of the course. A condition that the students must repeat the course in order to remove the "I" is not permitted. The maximum time allowed for a student to remove an "I" is one calendar year.

**Academic Integrity.** The university has explicit rules governing academic integrity. Please consult the OSU Fall 2010 Syllabus Attachment mentioned above on the web.

Working with another person or in study groups on problems can be helpful in learning the material. I encourage you to work together if you find it helpful. However, **all written and on line work submitted must be your own.** Copying someone else's problem solution, showing your written solution to someone else, or having another person complete your on line work is

prohibited; such behaviors are regarded as violations of academic integrity and will be treated according to the University's policy. In order to be successful in learning the material and doing well on the examinations you must think very hard about the problems themselves **before** discussing them with anyone else.

**Special Accommodations for Students.** "If you think you have a qualified disability and need special accommodations, you should notify the instructor and request verification of eligibility for accommodations from the Office of Student Disability Services. Please advise the instructor of your disability as soon as possible, and contact Student Disability Services, to ensure timely implementation of appropriate accommodations. Faculty have an obligation to respond when they receive official notice of a disability but are under no obligation to provide retroactive accommodations. To receive services, you must submit appropriate documentation and complete an intake process during which the existence of a qualified disability is verified and reasonable accommodations are identified. Call 405-744-7116 or go to [www.okstate.edu/ucs/stdis/](http://www.okstate.edu/ucs/stdis/)." (OSU Fall 2010 Syllabus Attachment)

**Office Hours.** I encourage you to come talk to me during my office hours (or email for an appointment if you can't make any of those times) when you have questions or concerns. When you come to my office hours or to the MLRC, you should come prepared with specific questions. We will not give you an overview of the content or summarize the book for you. You should have already taken notes on the online lectures, read through and taken notes on the relevant portions of the textbook, and attempted some problems. Be prepared to tell me or the tutor where you are stuck or what concepts are still confusing to you, and we will be happy to help.

**Final Note. Any changes in this syllabus will be communicated to you by the instructor in class or on our course website.**

Section/Topic	Hw Page	Homework Problems
Course Introduction/Overview		
R.1 The Real-Number System	7	12-57 multiples of 3
R.2 Integer Exponents, Sci. Notation, Order of Oper.	15	3-7 multiples of 3
R.3 Addition, Subtraction, and Multiplication of Poly.	22	6-51 multiples of 3
R.4 Factoring	30	3-120 multiples of 3
R.5 The Basics of Equation Solving	34	3-69 multiples of 3
R.6 Rational Expressions	43	9-39 multiples of 3
R.7 Radical Notation and Rational Exponents	52	3-57 multiples of 3
1.1 Introduction to Graphing	75	9-12, 17-20, 63-66, 79-86,95,96,107-112
1.2 Functions and Graphs	91	15-36, 40-41, 59-62, 74-77
1.3 Linear Functions, Slope & App	110	1, 2, 5, 6, 11-15, 29-32, 42, 43, 57-60, 69, 70
1.4 Equations of Lines and Modeling	124	1, 2, 7, 8, 13-16, 23-26, 31, 32, 43-46, 68, 69
1.5 Linear Equations, Functions, Zeros, a	143	1-6, 19-22, 29-32, 37, 38, 45, 46, 50, 51, 63, 64, 71-74
1.6 Solving Linear Inequalities	154	1-4, 13-20, 33-36, 43, 44, 55-58
2.1 Incr., Decr., and Piecewise Functions	175	1, 2, 13-24, 27, 28, 36, 37, 47-50
2.2 The Algebra of Functions	187	1-4, 11-14, 17-20, 29-32, 45-48, 57-62
2.3 The Composition of Functions	196	1-4, 9-16, 23, 24, 27, 28, 31-34
2.4 Symmetry and Transformations	214	7-12,27,28,39-42,49,50,53,54,59,60,67,68,71,72,85,86,97-100
2.5 Variation and Applications	224	1-6, 13-19, 25-28, 38, 39
3.1 The Complex Numbers	242	1-4,11-14,31,32,35,36,39,40,45,46,51 52 61,62,75,76,83 84
3.2 Quadratic Eqs., Functions, Zeros and	257	1-4 8,9,16-19,21,22,35-38,55,56,61,62, 69,70,85,86,95,96,102,103
3.3 Analyzing Graphs of Quadratic Functi	272	3-6, 11-14, 21-24, 31-34, 41, 42, 49, 50-52
3.4 Solving Rational and Radical Equatio	282	1-4, 19-25, 37, 38, 45, 46, 55, 56, 63, 64, 70, 71
3.5 Solving Eqs. and Ineqs. with Abs. Val	287	1, 2, 11-14, 25, 26, 29, 30, 43-46, 51, 52, 73-76
4.1 Polynomial Functions and Modeling	307	1-4, 23, 24, 27-30, 39, 40, 43-46, 51,52, 57, 58, 62, 65,66
4.2 Graphing Polynomial Functions	321	1-4, 7-14, 33-36, 49-52
4.3 Poly. Division; Remainder and Factor	329	1, 2, 5-8, 11-14, 23-26, 31-34, 49, 50
4.4 Theorems about Zeros of Poly. Functi	339	1-4, 13, 14, 25, 26, 33, 34, 43-46, 49, 50, 55-58, 71, 72, 79, 80
4.5 Rational Functions	357	7-16, 21, 22, 27, 28, 57, 58, 63, 64
4.6 Polynomial and Rational Inequalities	368	25-28, 33-38, 47, 48, 53, 54, 58-61, 67, 68, 77, 78
5.1 Inverse Functions	389	1-8, 33-36, 59-66, 83-86
5.2 Exponential Functions and Graphs	403	43, 44, 47-60, 63,64
5.3 Logarithmic Functions and Graphs	423	9-12, 23, 24, 29-32, 35-38, 45, 46, 69-72, 75, 76, 92, 94-96
5.4 Properties of Log Functions	433	1, 2, 9, 10, 17, 18, 23-26, 35, 36, 43-46, 53-56, 59,60, 65, 66, 89, 90
5.5 Solving Exponential and Log Function	444	1-4, 25-32, 51, 52, 60-65, 79-84
5.6 Growth and Decay; Compound Interes	455	1-3, 7, 8, 13-18
6.1 System of Equations in 2 Variables	483	7-10, 17-20, 33-36, 53, 54, 59-62, 65, 66, 69, 70
6.2 System of Equations in 3 Variables	494	1, 2, 17-20, 23, 24
6.7 Systems of Ineqs. and Linear Prog.	545	9-12, 19-22, 43-46, 51, 52, 65, 66, 71, 72
7.1 The Parabola	572	7-10, 15-18, 21-24, 31, 32
7.2 The Circle and Ellipse	582	7-10, 19-26, 31-34, 37, 38, 41, 42
7.3 The Hyperbola	592	7-15, 25-28, 37, 38, 39, 40
7.4 Nonlinear Systems of Eqs. and Ineqs.	603	7-26