

**INSTRUCTOR:** Dr. Harry S. (Steve) Mills, EDBH 134K, 970-339-6238.

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**Standard Policies and Services:** Please see the [Aims Standard Syllabus Policies](http://www.aims.edu/inside/policies/standard-syllabus/) (<http://www.aims.edu/inside/policies/standard-syllabus/>). This is where you and I go, in special or extraordinary circumstances, when extra guidance is needed on college policy. This helps us to keep this MAT 121 Syllabus on MAT 121.

Students who are *honest, and show common courtesy and common sense*, will never have to go to the Standard Syllabus's [Student Conduct section](#). If you have a [documentable disability](#), you really want to check out [what our Disability Services has to offer](#).

**Catalog Description:** Includes equations and inequalities, functions and their graphs, exponential and logarithmic functions, linear and non-linear systems, graphing of the conic sections, introduction to sequences and series, permutations and combinations, the binomial theorem, theory of equations and an introduction to matrices and determinants. 4 credit hours.

**Prerequisites: Prerequisite(s):** MAT 055 or higher (except MAT 090, MAT 103, MAT 107, MAT 108, MAT 109, MAT 112, and MAT 120), with grade of C or better, (except MAT 135 or BUS 226 - minimum grade of B or better) or assessment test. Registration in lab class MAT 093 may also be required depending on assessment score. Four credits.

**Methods of Instruction:** This is what is known as a "flipped course," which means that the lecture is delivered online, and the face-to-face time is broken up into a lot of "do homework and ask questions" time, and a relatively small number of organized activities, mostly in the beginning, until we get into a routine and know where everything is. For Example:

1. Orientation talk, Day 1. Short and sweet, hopefully. We can do a "Who are ya, where ya from, 'n' where ya goin'?" session if you folks are interested...
2. Kick-starting small group interactions on the board, for those who like it. I want people to feel free and comfortable enough to just pop up and work together, if it helps them to put their heads together on something. But I'm not too interested in making anybody go to the board, if they don't want to!
3. Announcements (hopefully few and brief).
4. Whiteboard presentations, by me. (few and relatively brief).

Things I want to encourage:

1. Students asking each other (and me) questions;
2. Students working together, informally, on the whiteboard, discussing (maybe arguing) problems;
3. Students working on homework, in class, especially the parts of the homework that were tough or confusing (... while there's somebody around who prob'ly knows the technique! Multiple somebodies!);

I encourage the use of electronic devices in class. Many students will spent *most* of the class time on their laptop, with earphones in, doing homework and watching homework videos at their own pace. *Few* students can get everything done in the 3.333... hours per week that we're face to face. My hat's off to students who can use their hand-held devices to watch the lecture videos.

4. Students pre-testing themselves, and otherwise topping-off a test-segment-length chunk of new material;
5. Students re-hashing old tests, making sure they're ready for the *next* time the jerk instructor asks *that* one, which he *will*, because Murphy's Law. (Especially those pesky Section 1.7 absolute-value inequalities!).

**Required Materials:**

**Textbook:** College Algebra, 6th Edition, Dugopolski. There are options for the book.

- You can buy it bundled with MyMathLab access code (New Books Only).
- You can simply buy e-access to the MyMathLab, which includes the online version of the book, directly from the publisher of the book on the [Pearson MyLab and Mastering Website](#).
- You can buy it used.
- You can just buy access to the eBook, by purchasing MyMathLab access, direct from the [Pearson Website](#).
- There's a looseleaf version of the textbook that's cheaper than the hard-back book. Inquire at the bookstore or on the [Pearson Website](#).

**Scientific Calculator:** The TI 30X IIB or comparable product with a Previous Entry feature is preferred. When you can see what you entered, you'll make fewer mistakes, be able to fix any mistakes you make, and explore patterns, by changing one thing in a big formula, and seeing how the output changes, without having to re-enter the whole long expression. What you want is a calculator just one step below a graphing calculator, that lets you edit the entries like you do in a graphing calculator.

GRAPHING CALCULATORS ARE NOT PERMITTED ON TESTS, although you'll be using online graphers, like the one on [Wolfram Alpha](#), or a graphing calculator, like a TI-84. [Wolfram Alpha](#) can do almost *anything*! Some 'phone-savvy individuals find awesome apps that are better than anything I know about.

**Course Website:** Log in to [Aims Online](https://online.aims.edu/) ( <https://online.aims.edu/> ). Navigate to this class.

**Optional Materials:**

**MyMathLab:** Great resource. Not end-all, be-all.

For an on-demand experience, access the homework, help and video instruction available in [Pearson MyLab and Modified Mastery](#) ( <http://www.pearsonmylabandmastering.com/> ). It is integrated with [all the homework exercises](#) I have assigned for the course. To get started on MyLab, right now, go to [Pearson Get Started](#) ( <http://www.harryzaims.com/121-all/pearson/Register-for-MyLab.pdf/> ).

The MyMathLab is *optional*, but *highly recommended as a learning tool*. Nevertheless, I *still* require you to submit written homework (See below), and you don't absolutely *need* the MyMathLab to access the exercises. And if you use the MyMathLab, I still want the same written work to cross my desk. I'm not going by the points totals on your MyMathLab, at all. But I can gain insight on your math activities, for instance, if you log a lot of hours, I'll notice it, and be curious how you're using it, and how it's working for you.

While some students will go the whole nine yards, to get the right answer accepted by the MyMathLab, the reason it's being put in front of you, here, is that the MyMathLab has nice "Show me how to work this" and "Work this problem (for me)" features that can be very helpful in getting the right idea, *quickly*, especially if my notes or video didn't quite get it done for you. Just don't waste too much time trying to get the answer accepted as "correct" by the program. Just make a note that you're not getting that one, right, and check out my video on that problem, and/or ask me about it in class.

On tests, there's no "Use the graphing tool..." or "click on the correct graph" nonsense. So a person who's *just* playing the MyMathLab game, without doing the writing, or watching the [videos on harryzaims.com](#) is missing a lot of the ideas and techniques I am trying to teach. The MyMathLab doesn't quite do everything, because it can't. And the book, itself, doesn't give full coverage of graphing techniques. There's only so much you can do with the interface, right now.

**Homework Video:** Every problem I've assigned, for the semester, is worked, by me, on a video. I pack pretty much everything I have to say about the concepts we're covering in the homework videos. The videos are the

lectures! But the lectures are all against the backdrop of a problem to be worked. If you're wondering why I'm not giving a lecture every day, it's because I've already said everything I have to say on the subject in the videos! I keep *all* my videos in my [College Algebra Videos Directory](http://www.harryzaims.com/121-all/videos/) (<http://www.harryzaims.com/121-all/videos/>). Sometimes the **numbers** are different, but yeah, I have worked every exercise, so if you get stuck, and want to ask about it. BOOM! There's my 5-minute spiel on the problem, and a worked version of the problem for you to study.

To work the same exact version of the problem in the videos, open up the notes that accompany the videos and work the version given in the notes! Easy-peasie! There are *multiple* versions of the problems available to you, and if you buy the book *and* use the notes, there's at least 2 versions, right there. If you buy the MyMathLab for about \$90, you can generate *several* versions of the exercise, for extra practice, as needed.

**Graphing Calculator:** While we're denying their use on tests, a graphing calculator, or graphing app on your smartphone, or one of the many free online graphers, available online, *must* be used, to do some of the explorations that come up in the homework. You'll want to use whatever works for you, but you will need some standard graphing calculator capabilities for some of the assigned exercises. I've become a fan of [Wolfram Alpha](http://www.wolframalpha.com/) (<http://www.wolframalpha.com/>), which does graphs and solves equations and inequalities, among other things.

**Grades:** Four Categories: Homework (20%), Tests (60%), Writing Projects (10%), **Attendance (10%)**.

**Homework:** I have compiled [a list of all the assigned problems for this semester](http://www.harryzaims.com/121-all/homework-assignments/). (<http://www.harryzaims.com/121-all/homework-assignments/>). *Versions* of these same problems are in the textbook exercises and the exercises on the MyMathLab site. I say "versions," because there's a textbook version *and* multiple MyMathLab versions of all the assigned exercises. Access to auto-generated practice problems of the same type is a nice feature of the MyMathLab as a self-training tool.

I'm only with you for 200 minutes per week. That's  $200/60 = 3.333\dots$  hours per week. Weekly time commitment for a 4-credit math course is roughly 12 hours per week. *Most* of the time you'll spend on this class is on homework and most of the time spent on homework and homework videos must be outside of class. I will definitely open up class time for getting homework done, since I expect you to get the "lecture" part of the class from the homework videos.

By the 2<sup>nd</sup> problem of a given type, I'm assuming you've seen the first one, because if you *have* seen the 1<sup>st</sup> video, you don't need another re-hash of the general stuff. So I'm trying to save time for all the people who just watch every video, in sequence. Make sense?

I do not grade the homework for *correctness*, so much as I grade for its report quality. This I typically ascertain at a glance. Different people may submit different versions of the same exercises, depending on the tools they use.

1. Is the paper standard 8 ½ " x 11 " size?
2. Is the paper college-ruled?

*Surprisingly, disconcertingly, I require **plain white paper, no lines**. It's what is used on tests, and is superior for the kind of free-form work and thought that I want from you. So get a ream of the cheapest copier paper you can find.*

3. Is there any work on the back side of the paper?

*I don't know. I won't look! 1-sided helps in a number of ways, including scanning, but also for making notes, afterward, as I will demonstrate.*

4. I'm done with staples. Let's use paper clips, this semester.

*I'll always have a handful, if you don't have one.*

5. Is it clear to the reader what assignment it is?

*Write 121-G11 S 1.1 in the top left corner, for the first assignment, Section 1.1, and 121-G11 S 1.2 in the top left corner for the Section 1.2 assignment and so on.*

6. Is it clear to the reader whose work it is?

*If your signature is too cryptic for me to read, I'll need to see your printed name next to it a few times.*

7. Is it legible?

8. Is it *dark*?

*Some students write very lightly. I cannot read that. If you have to, use a pen to be dark enough to satisfy. Put one line through anything you would otherwise have erased. I'll give you a heads-up if your work's not dark enough. I really need the high contrast, due to glaucoma. Kindness points? smh*

9. Is there plenty of extra space around and between problems?

*You win no prizes saving paper by cramming stuff together. I take off points if it's too hard to find something or follow what you're doing. More kindness points?*

10. Is it clear to the reader what is being asked?

*Include however much of the instructions it takes to convey to the reader what the **question** is. Word-for-word instructions will always work. Most students will learn how to shorten things up and still cover everything.*

***You're writing a self-contained "What This Is And How This Is Done" report.** And it turns out that the better you get at this, the less time you have to spend studying the stuff, before the test.*

There really is no reason not to have perfect homework, with correct answers, since complete, written solutions are given away. If you're turning in incorrect work, it's your own fault. You are responsible to check your work against the notes. Sometimes I scratch my head at work that is *totally* wrong, even though I gave you solutions! TAKE CHARGE!

If you want to see *my* work on the exact version of the problem you work, then, by golly, work the versions of the problem that are given in my notes. My notes are always found with the homework videos on those problems. Just be aware that if you use my work as a crutch, you *better* work another version of the problem, to make sure you get it.

If you have a *question* on anything, we can sit down and work on it, together. But you should always look at the corresponding video, any time you get stuck, first. Make sure you've done your due diligence before asking, so I can take you straight to what you need.

20% is a small fraction of the total points, but the bread and butter of the course. It's where you *learn* this stuff.

I'm generally fairly loose on homework deadlines. As I provide solutions, it's about your learning more than trying to stick it to you on the points. The deadline for all sections from the current chapter is the class meeting immediately following the test over that chapter.

**Tests:** Tests will count 60% of the final grade. I've done away with a heavy-weight, comprehensive final, for this semester. 5 tests. The Final Test will be lumped in with all the rest of your tests, for grading purposes. The Final Test *is* comprehensive, as are *all tests in this course*, so questions or problems from the previous tests are all fair game on any future test. I especially like to include problems from previous tests that many in this class struggled with. You know the ones you need to make sure you can work, and I get to see the class master a problem area.

*Special:* You may replace the lowest of your first 4 tests with your final test score. If you *miss* a test, that will be how it is handled. If you miss a 2<sup>nd</sup> test, well, we're going to have words. Heh. Seriously, a Makeup Test will require a documentable reason, and be at my discretion.

The **Final Test** is Test 5, Wednesday, December 7th, 7:10 – 9:00 a.m.

**Makeup Tests, Deadlines and such:** Makeup tests generally require a college-excused absence. I reserve the right to make exceptions, but it's very difficult to get an exception. To be lax on this would be disrespectful to every student who showed up at the appointed time and place.

**Writing Projects: Writing Projects are 10% of your grade.** There are three (3) [Writing Projects](#).

( <http://www.harryzaims.com/121-all/videos/03-Writing-Projects/> )

I wouldn't worry too much about them, the first week. They're generally due in the run-up to the chapter test for the relevant chapter. Like a "super" homework assignment that ties things together better than the book, alone, or the MyLab, alone.

**Grading Scale:** 90% - 100% A 80% - 89% B 70% - 79% C 60% - 69% D

**How to Operate:** My biggest thing, early, is to clear away the distractions, and keep you focused on the fast path to completion. There are *many* resources available, but only a minimum number of activities that I *require*.

1. Carve out 12 hours per week, to begin with. 3 hours a day, 4 days a week is a typical face-to-face schedule, with 4 of those hours in class, and 8 hours out of class. Most students will find that some weeks, it takes more or less time, due to brushing-up on skills that may be rusty, or because a new concept is more or less difficult for the student. CLEVER students will use the extra time to get ahead on coming concepts.

2. Focus on keeping up with the Chapter homework. You need to keep up with the test schedule.

3. There are optional assignments in Chapter P, for “prerequisite.” I’m in the process of prepping videos for those problems. All the rest of the assignments have video from me, as well as whatever help you can find on Pearson site, or elsewhere. This material could be useful, if you need to brush up on a topic.

4. When possible, do homework *ahead of schedule*. You want to leave yourself plenty of time to test yourself on an old test or two, pinpoint your weaknesses, and tie up all loose ends, with a day or two to spare, before the test.

**Stop-Out:** Students who are inactive for 2 weeks will be reported as Stop-Out and dropped from the roster.

**General Education Competencies:** This course satisfies the following General Education competencies: Critical Thinking, Technology, and Mathematics. It also satisfies the Aims requirement for Writing. Refer to Aims Community College catalog for descriptions.

**Learning Outcomes:**

A. Be familiar with set notations, subsets of the real numbers and properties of real numbers.

B. Perform algebraic manipulations including working with exponents, radicals, polynomial operations, factoring and algebraic fractions.

C. Solve the following types of equations: linear, quadratic, equations involving radicals, equations in quadratic form and equations involving absolute value.

D. Work with formulas including formula evaluation and solving a formula for any of the variables.

E. Read and analyze problems in the form of word problem applications and obtain solutions using equations.

F. Solve first degree inequalities, higher degree inequalities and inequalities involving absolute value.

G. Recognize and graph linear functions, rational functions, absolute value functions, and graph inequalities in two variables.

H. Work with function notation and demonstrate knowledge of the meaning “function”.

I. Demonstrate an understanding of function composition, one-to-one functions and inverse functions.

J. Evaluate and graph exponential functions.

K. Evaluate and graph logarithmic functions.

L. Work problems and solve equations containing exponential and logarithmic functions.

M. Use at least two of the following techniques to solve linear and non-linear systems of the equations: substitution, addition, Gaussian elimination, Cramer’s rule.

N. Have some familiarity with matrices and operations involving matrices.

O. Graph systems of inequalities.

P. Graph conic sections including circles, parabolas, ellipses and hyperbolas.

Q. Identify the conic section represented by a given second degree equation.

R. Work with series notation and sequence formulas, and counting principles.

S. Apply the Binomial Theorem.

T. Demonstrate an understanding of proof by mathematical induction.

U. Present topics in theory of equations.

V. Perform synthetic division.

W. Use the Remainder Theorem and the Factor Theorem to factor and evaluate polynomials.

- X. Solve polynomial equations using the Rational Root Theorem and/or approximation techniques.
- Y. Write and speak clearly and logically about topics related to algebra.
- Z. Demonstrate the ability to select and apply contemporary forms of technology to solve problems or compile information in the study of algebra.