

# MA109 Fall 2016 - College Algebra

## Course and instructor demographics

MA 109 is taught by several instructors in several sections. For office hours, meeting times, and contact information, please see the tables below.

### Instructors

It is very important to keep up with your class and to inform your instructor as early as possible of any problems or concerns. Many instructors have multiple hundreds of students, and so there may be delays or special requirements needed to handle what may appear to be simple problems. On the other hand our instructors are highly trained professionals and may be able to help you solve what seem like insurmountable challenges. In either case, the more time the instructor has to consider your case, the more likely you are to have a good result.

Instructors hold drop-in office hours at the times and places listed below. You can stop by to ask questions about the course material or structure. Most instructors also are available in the [Mathskeller](#) where you can ask them (or any other instructor present) for help in the course.

Instructor	Email	Office Location	Office Phone	Office Hours	<a href="#">Mat</a>
{{(instructor.name)}}	{{(#instructor.email email)}} {{(email)}}{(/email)}	{{(instructor.office)}}	{{(instructor.officePhone)}}	{{(instructor.officeHours)}} {{(^instructor.officeHours)}}by appointment{(/)}	{{(instructo

### Sections

Active, engaged class participation is required in all sections. Make sure you know when and where your class meets and make sure to bring appropriate materials to class (a way to view the textbook, a place to take notes, any calculator you want to practice using). Your active, engaged class participation is a major component of your final grade.

The rooms for your first three exams are also listed:

Section	Instructor	Room	Time	Exam room	Final room
{{(classy.section)}}	{{(classy.instructor instructorKey)}} {{(#info.instructors[instructorKey] instructor)}} {{(instructor.name)}} {{(/instructorKey)}}{(/instructor)}	{{(classy.room)}}	{{(classy.days)}} {{(classy.beg)}}- {{(classy.end)}}}	{{(classy.examRoom)}}	{{(classy.finalRoom)}}
{{(rec.section)}}	{{(#rec.instructor instructorKey)}} {{(#info.instructors[instructorKey] instructor)}} {{(instructor.name)}} {{(/instructorKey)}}{(/instructor)}	{{(rec.room)}}	{{(rec.days)}} {{(rec.beg)}}- {{(rec.end)}}}	{{(rec.examRoom)}}	{{(rec.finalRoom)}}

## Course description

College Algebra covers selected topics in algebra, such as a review of grade school algebra, quadratic formula, systems of linear equations, introduction to functions and graphing. Please see [this more detailed schedule](#) with [supporting lecture notes and worksheets](#). In particular, we will cover solving equations (linear, quadratic, power, radical, and absolute value equations, as well as equations mentioning the unknown only once), graphing on the Cartesian coordinate system (with special emphasis on lines, their slope, perpendicular and parallel lines), solving systems of equations (with substitution and elimination, both linear and non-linear), using technology (such as graphing calculators and numerical root finders), solving applied problems, inequalities, and general functions, with special emphasis on exponential, logarithmic, polynomial, and rational functions.

The [2015-2016 Bulletin](#) describes the course as

*Selected topics in algebra. Develops manipulative algebraic skills and mathematical reasoning required for further study in mathematics. Includes brief review of basic algebra, quadratic formula, systems of linear equations, introduction to functions and graphing. This course is not available for credit to persons who have received credit in any mathematics course of a higher number with the exceptions of MA 111, 112, 123, 162, 201 and 202. Credit not available on the basis of special examination. Prereq: Two years of high school algebra and a Math ACTE score of 21 or above or a Math SAT score of 510 or above; or MA 108R; or appropriate score on the math placement test or grade of C or better in MA 111.*

### Grading

Your final grade is a letter grade A, B, C, D, or E. It is computed from several components (as indicated in the table). Each exam is taken in the evening, and has a very strict absence and cheating policy (be careful not to get a zero on the exam). Homework is completed online and requires paying a significant fee (\$60 to \$150) with the textbook. The instructor score will measure active, engaged, in-class participation. It may be based on pre-class online quizzes, in-class activities or quizzes, or post-class online quizzes. Once the semester is over, including the final exam, your total points can be compared against the grading cutoffs table to find the matching letter grade. Any curve will be decided after the final exam is graded, but is unlikely to be significant barring unforeseen circumstances. A typical grade distribution is 20% of students assigned an A, 25% B, 20% C, 10% D, 10% E, and an additional 15% withdrawing. Grade distributions may change from semester to semester, but this provides a rough indicator of the difficulty students as a whole have with the course. Please note that the [option to retake this course will be more limited](#) in the future.

Grading components			Grading cutoffs		
Points	%	Assessment	Minimum points	Minimum Percent	Grade
100	18%	Exam 1			
100	18%	Exam 2			
100	18%	Exam 3			
100	18%	Final Exam	495	90.0%	A
75	14%	Online Homework	440	80.0%	B
75	14%	Instructor Score	385	70.0%	C
			330	60.0%	D
550	100%	Total	0	0.0%	E

### Student learning outcomes and course goals

The goal of this course is to prepare you to use the basic tools of algebra to manipulate both known and unknown numerical quantities. By succeeding in this course, you should be prepared to study elementary calculus (as presented in MA 123) as well as being able to understand and work with mathematical models in your other course work.

Students who successfully complete this course will be able to:

- Recognize reasonable answers based on number sense and the algebraic relations that must be satisfied by solutions.
- Recognize and operate with covariational and functional relationships between quantities
- Read and express those relationships as implicit equations, explicit (functional) equations, graphs, tables of values, and verbal descriptions
- Manipulate implicit and explicit equations to solve for a chosen variable, or recast a functional relationship in terms of a chosen independent quantity.
- Use algebraic techniques to solve applied and modelling problems in restricted settings appropriate for a general mathematics course
- Analyze and evaluate sample arguments and solutions for correctness and reasonableness
- Analyze limitations of models, especially in terms of piecewise functions and domain restrictions
- Use appropriate technology to understand and solve problems

### Required course materials

#### Textbook

The textbook *College Algebra*, by Thomas W. Hungerford and Douglas J. Shaw is required. You may use the 4th or 5th edition of the book, but please keep in mind the requirement to have an access code for WebAssign (an additional \$65 if not purchased with a 5th edition book, but it can be called *Contemporary Precalculus* by Hungerford and Shaw).

We use a customized (\$50 cheaper) version of the original book, which is specifically published for the University of Kentucky and can be purchased at any UK bookstore (about \$150). There is also an ebook version (\$65 from WebAssign). The original and ebook versions are called *Contemporary Precalculus*.

#### Access Code for WebAssign

If you purchase your textbook new at any UK bookstore, this will come bundled with the book. Otherwise you will need to purchase the access code from the homework website WebAssign for about \$65. You can use WebAssign free until Wednesday, August 31 by logging into [Canvas](#). It appears that Safari on a Mac computer cannot login. We recommend using [Google Chrome](#). Once you purchase the access code, login as usual through [Canvas](#) and it will complete the registration.

#### Clicker

Your [instructor score](#) is based on active, in-class participation. The way this is measured depends on which [section](#) you are in. You may want to see the [submission guidelines](#) for some details.

In the large sections, 001-014, you will need a "Reef Technologies iClicker subscription" for \$15 per semester. They can be purchased from the UK bookstore, or directly from the phone app. If you don't have a device to view webpages on during class, then ask your instructor about other options. You'll need to register them on [Canvas](#).

Students in the small sections, 015-022, do not need an iClicker. You may be asked to purchase 3x5 index cards (a dollar or two for the semester).

#### Lecture Notes

We will be using notes written for you as a complement/guide to the textbook in order to assist you throughout the course. We will also be using practice problems at the end of every set of notes that have been designed to get you practicing during lecture. These are available for free on our website (though you'd have to pay for printing if you wanted paper versions).

Lecture notes and worksheets			
Textbook	Lecture Notes	Worksheet	Slides
Section 1.1	<a href="#">A bit of review (handwritten) (typeset)</a>	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>
Sections 1.1, 1.2, 5.1A	<a href="#">Solving equations wisely (handwritten) (typeset)</a>	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>
Sections 1.3, 1.4	<a href="#">The Cartesian coordinate system (handwritten) (typeset)</a>	<a href="#">worksheet (answers)</a>	
Sections 11.1, 11.1A	<a href="#">Systems of equations (handwritten) (typeset)</a>	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>

Sections 2.1, 2.2	<a href="#">Using technology wisely (handwritten)</a> (typeset)	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>
Section 2.3	<a href="#">A strategy for solving application problems (handwritten)</a> (typeset)	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>
Section 4.6	<a href="#">Inequalities (handwritten)</a> (typeset)	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>
Chapter 3	<a href="#">Functions (handwritten)</a> (typeset)	<a href="#">worksheet (answers)</a>	<a href="#">slides</a>
Chapter 5	<a href="#">Exponential and logarithmic functions</a>	<a href="#">worksheet</a>	<a href="#">slides</a>
Sections 4.1 to 4.4	<a href="#">Polynomial functions</a>	<a href="#">worksheet</a>	<a href="#">slides</a>
Section 4.5	<a href="#">Rational functions</a>	<a href="#">worksheet</a>	<a href="#">slides</a>

### Calculator

For part of the course you will need a graphing calculator. A standard choice is the TI-84 (\$75 to \$125). Most graphing calculators have the same basic functions, and you should be able to learn about your calculator by reading the manual.

Using the calculator during a test for any reason other than performing the required calculations (for example, to recall a previously stored formula) will be considered cheating. You may use any graphing calculator that is [allowed by ACT](#). Note that you will not be allowed to use the calculator on a cell phone, or any other communication device. Furthermore, you may not use any calculator that has a computer algebra system (CAS) or a QWERTY keyboard. In particular, you may not use the TI-Nspire CAS, any TI-89, any TI-92, the HP 48GII, any HP 40G, any HP 49G, any HP 50G, the Casio Algebra fx 2.0, the Casio ClassPad 300, the Casio ClassPad 330, or any Casio CFX-9970G.

### Course policies

There are a number of important policies that can have a dramatic effect on your understanding and final grade in this course. These policies are intended to be uniform and simple, but if you have not read over them, they may have unexpected consequences.

### Important dates

See the [Academic Calendar](#), the [Common Hour Exam schedule](#), and the [Final Exam schedule](#) for Fall 2016.

Wednesday, August 24	First Day of Classes
Tuesday, August 30	Last Day to Add
Monday, September 5	Labor Day (no classes)
Wednesday, September 14	Last Day to Drop
Wednesday, September 21	Exam 1 (7:30pm - 9:30pm)
Wednesday, October 19	Exam 2 (7:30pm - 9:30pm)
Friday, October 21	Midterm grades
Tuesday, November 8	Presidential Election Day (no classes)
Friday, November 11	Last Day to Withdraw
Wednesday, November 16	Exam 3 (7:30pm - 9:30pm)
Wednesday, November 23 to Friday, November 25	Thanksgiving Break (no classes)
Friday, December 9	Last Day of Classes
Thursday, December 15	Final Exam (6:00pm - 8:00pm)

### Attendance

Active, engaged, in-class participation is mandatory and forms a major portion of your final grade. You should be ready to work when class begins (for example: seated, notes and pencil ready, attention to the front, quiet at 8:00am if the class starts at 8:00am). You should not pack up or leave until class is over (for example: you should still be working at 8:49am if the class ends at 8:50am). If you have special circumstances, please contact your instructor before class begins so that they can excuse late arrivals or early departures. Unexcused late arrivals or early departures may result in significant reduction in participation grade for each day on which they occur.

An absence can only be excused if the instructor is notified within a week of the absence. The choice to excuse the absence is with the instructor, though excuses will be granted (given timely notification) according to [University Senate Rule 5.2.4.2](#): namely (a) serious illness, (b) illness or death of a family member, (c) University related trips, (d) major religious holidays, (e) other reasons deemed reasonable by the instructor. In the case of (c) and (d) notification must be provided one week in advance. In all cases documentation may be requested to ensure the absence does meet policy. For (a) a University Health Services Tier 2 or Tier 3 excuse is required, or a similar note from a health care provider who will confirm that you are a patient and were seen on the indicated day. Documentation that cannot be verified may result in the absence not being excused.

Absences can affect three major types of grade, and the policies for how absences affect each grade differ: **Homework** extensions should be requested before the homework solutions are available. Homework is available many weeks in advance, so that absences of type (c) and (d) can usually be handled without recourse to a homework extension. **Instructor score** measures a continued commitment to engaged, active in-class participation, but also recognizes that with other a thousand students there may be a number of exceptional events. Unless your instructor announces otherwise (through canvas), the following policy applies: if the number of instructor score absence excuses requested by a student is 5 or fewer, then no documentation need be given (you may still want to send a simple email stating that you will be or were absent, but you do not need to expect a reply). If the number of absence excuses requested is 6 or more, then the standard policy regarding

documentation applies (though the documentation shall be due one week after it is requested). In particular, keep documentation for excused absences, especially regarding chronic conditions of type (a) or (b). Absences for **exams** are quite serious. An unexcused exam absence results in 0 for the exam grade, which lowers your final grade by at least a letter grade. To allow for exceptional circumstances, there is a simple alternate exam sign-up available in your canvas course. We have a number of alternate times available to take each exam, and any request received before one week prior to the exam for one of those times will be automatically granted (excused). On the other hand last minute requests or requests that would require undue hardship are likely to be rejected (unexcused). Absences of type (a) and (b) should be reported within 24 hours of the exam to ensure that a reasonable accommodation can be found. Exam absences not reported within a week are automatically unexcused and result in a zero on the exam.

### **Submission of assignments**

Homework must be submitted online at WebAssign, in the appropriate course as accessed from [Canvas](#). WebAssign is a for-profit company that charges a fee to use their online homework. The student is responsible for paying this fee. The textbook at the UK Bookstore includes this fee (about \$150 including both book and fee). The WebAssign website should also provide a link to purchase an online-only version of the textbook that also includes this fee (about \$65 including both e-book and fee).

The homework due dates are listed in the [course schedule](#). Homework assignments are always due at 11:59 pm. Please note that if you are having trouble with the website, you should contact WebAssign for [help](#). There will be many homework sets throughout the semester. You can see the homework assignment due dates on the class schedule. Note that two of these assignments are due during Dead Week.

Exams must be taken at the specified times and locations, or an alternate exam must be approved by the instructor, using the form in canvas. You are expected to take the exam without notes, textbooks, online access, or communication with your peers. You may use a calculator approved for use on the ACT.

Instructor score may require submission of online quizzes (also on WebAssign) that may be due before class ("reading checks"), during class ("emporium style"), or after class ("daily quiz"). Sections 001 to 014 require the use of Reef Technologies iClicker which costs about \$15 (and can be used on your smart phone, tablet, or laptop). Instructor score may also require taking a short in-class quiz at the beginning ("entrance slip"), middle ("pop quiz"), or end ("exit slip"). You may be expected to bring your own index card to turn in the quiz, especially in sections 015 to 022.

Please notify your instructor in advance if you need **accommodations** due to disability. Exam accommodations require one week notice to get everything in place. Most accommodations can be worked out (in broad strokes) with the [disability resource center](#). They will provide you with a letter for your instructor that should make finding accommodations easy. You should still check with your instructor that everything looks fine (and arrange a private meeting if details need to be discussed).

### **Academic Honesty**

All assignments, exams, quizzes, projects, and exercises completed by students for this class should be the product of the personal efforts of the individual(s) whose name(s) appear on the corresponding assignment. Cheating or plagiarism is a serious offense and will not be tolerated. Any potential cheating case will be thoroughly investigated, and could lead to failure in the course or even to expulsion from the university. See Student Rights and Responsibilities in the [University Senate Rules \(Sections 6.3.1 and 6.3.2\)](#) for information on cheating, plagiarism, and penalties. A summary of recent changes to rules on cheating can be found at the [academic ombud website](#).

### **Classroom Behavior, Decorum, and Civility**

Students are expected to be actively participating during class. Students are also expected not to distract others. If you arrive late, leave early, are distracted by your phone, or are otherwise not actively engaged with the class you may not receive credit for participating that day. If you are disrupting class, you may be asked to leave.

College Algebra is traditionally a very difficult class, and many of your classmates will be having a hard time adjusting both to the university and to the demands of the class. You are expected to treat your classmates with respect. It is reasonable to disagree, but you should express your disagreement respectfully. Personal attacks or statements denigrating another on the basis of race, sex, religion, sexual orientation, gender or gender expression, age, national/regional origin or other such irrelevant factors are considered a severe disruption. Harassment will not be tolerated.

### **Dead week**

Homework score and instructor score continue as usual. Homework is due and the typical measures of in-class participation will be present. No papers or exams will be given during dead week.

### **Limited course repeats**

University Senate rule 4.3.3 allows department chairs to prevent a student from registering in a course for a third time, unless a student has withdrawn for urgent, non-academic reasons. Beginning in Fall 2016, the Department of Mathematics will begin enforcing this rule for students attempting a fourth registration in MA 109, 110, 113 and 137.

### **Course Schedule**

The following is a tentative course schedule. The homework assignments correspond to the lecture notes.

Mon	Tue	Wed	Thu	Fri
Aug 22	Aug 23	Aug 24 First Day of Classes	Aug 25	Aug 26 HW: Check-in
Aug 29	Aug 30 Last Day to Add HW: A bit of review	Aug 31	Sep 1	Sep 2 HW: Solving Equations A
Sep 5 Labor Day (no classes)	Sep 6 HW: Solving Equations B	Sep 7 HW: Mini-Exam 1	Sep 8	Sep 9 HW: Solving Equations C
Sep 12	Sep 13 HW: Solving Equations D	Sep 14 Last Day to Drop	Sep 15	Sep 16 HW: Cartesian coordinates A
Sep 19	Sep 20 HW: Cartesian coordinates B	Sep 21 Exam 1 (7:30pm - 9:30pm)	Sep 22	Sep 23
Sep 26	Sep 27 HW: Systems A	Sep 28	Sep 29	Sep 30 HW: Systems B
Oct 3	Oct 4 HW: Systems C	Oct 5 HW: Mini-Exam 2	Oct 6	Oct 7 HW: Tech Wisely
Oct 10	Oct 11 HW: Applied	Oct 12	Oct 13	Oct 14 HW: Inequalities
Oct 17	Oct 18 HW: Functions A	Oct 19 Exam 2 (7:30pm - 9:30pm)	Oct 20	Oct 21 Midterm grades
Oct 24	Oct 25 HW: Functions B	Oct 26	Oct 27	Oct 28 HW: Functions C
Oct 31	Nov 1 HW: Functions D	Nov 2 HW: Mini-Exam 3	Nov 3	Nov 4 HW: Functions E
Nov 7	Nov 8 Presidential Election Day (no classes) HW: Functions F	Nov 9	Nov 10	Nov 11 Last Day to Withdraw HW: Exp/Log A
Nov 14	Nov 15 HW: Exp/Log B	Nov 16 Exam 3 (7:30pm - 9:30pm)	Nov 17	Nov 18
Nov 21 HW: Written Project	Nov 22 HW: Exp/Log C	Nov 23 Thanksgiving Break (no classes)	Nov 24 Thanksgiving Break (no classes)	Nov 25 Thanksgiving Break (no classes)
Nov 28	Nov 29 HW: Poly A	Nov 30 HW: Mini-Exam 4	Dec 1	Dec 2 HW: Poly B
Dec 5	Dec 6 HW: Poly C	Dec 7	Dec 8	Dec 9 Last Day of Classes HW: Rational
Dec 12	Dec 13	Dec 14	Dec 15 Final Exam (6:00pm - 8:00pm)	Dec 16

## Study help

In addition to the [lecture notes](#), the [textbook](#) and your [instructor's office hours](#), you may find the following useful for studying:

## Old exams

The topics covered on each exam in MA 109 may change slightly from semester to semester. Thus, the exams which are linked to this page may cover different topics than the exams to be given this semester in MA 109.

Spring 2016	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Fall 2015	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
	<a href="#">Explanation 1</a>	<a href="#">Explanation 2</a>	<a href="#">Explanation 3</a>	<a href="#">Explanation 4 (and another)</a>
Spring 2015	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Fall 2014	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Spring 2014	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>

	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Fall 2013	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Spring 2013	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Fall 2012	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Spring 2012	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Fall 2011	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>
Spring 2011	<a href="#">Exam 1</a>	<a href="#">Exam 2</a>	<a href="#">Exam 3</a>	<a href="#">Exam 4</a>
	<a href="#">Key 1</a>	<a href="#">Key 2</a>	<a href="#">Key 3</a>	<a href="#">Key 4</a>

### Services in The Mathskeller and The Study

The Mathskeller is located in CB 063 in the basement of the classroom building. Many instructors from the Department of Mathematics will hold office hours in the Mathskeller. In addition, limited drop-in tutoring is available. The Mathskeller is open from 9am to 5pm Monday through Friday (except academic holidays) during the semester. Additional information is available at <http://www.math.uky.edu/~mathskeller/>.

The [Peer Tutoring Program](#) offers FREE drop-in tutoring for many University of Kentucky (UK) core courses. Offering proactive assistance, the goal of the Peer Tutoring Program is to enhance students' academic experience as early and as often as possible. The Peer Tutoring Program provides a welcoming and friendly atmosphere for students to drop in, as they wish, to seek help on homework or exam prep, or simply to study within a group environment. Peer Tutors in [The Study](#) and [The Study North](#) are nationally certified, well-trained undergraduate students who have successfully completed the course for which they tutor at UK. This makes them a great resource for questions about a professor or course format in addition to questions pertaining to the subject.

Peer tutoring is offered in two locations—The Study, on the third floor of the Complex Commons building in the Blanding-Kirwan Complex on south campus, and The Study North, on the first floor of Champions Court I/Jewel Hall (residence hall across from the Student Center) on north campus.