

# College Algebra — Math 1050

## SPRING 2018

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**Instructor** Ethan Levien  
**Location** SFEBB 160  
**Contact** levien@math.utah.edu  
**Office Hours** TBD; *or by appointment*  
**SI** TBD

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**Course Goal:** Improve quantitative reasoning and prepare for future math learning in calculus, linear algebra, and discrete mathematics.

**Instructor Goal:** Provide a well-structured course in which each student a) is successful, b) enjoys the learning experience, and c) gains skill and confidence in logical reasoning.

**Topics to be covered:** Numbers, functions, sequences, series, counting problems, graphs of functions, inverse functions, polynomials, rational functions,  $n$ -th roots, exponential functions, logarithms, piecewise defined functions, matrices, and matrix equations.

### **Expected Learning Outcome:**

1. Sketch the graph of basic polynomials (second and third order), rational, radical, exponential, logarithmic, and piecewise functions with or without transformations. Be able to identify important points such as  $x$  and  $y$  intercepts, maximum or minimum values; domain and range; and any symmetry.
2. For rational functions, identify  $x$  and  $y$  intercepts, vertical, horizontal and oblique asymptotes (end behavior), and domain. Use information to sketch graphs of functions.
3. For polynomial functions identify all zeros (real and complex), factors,  $x$  and  $y$  intercepts, end behavior and where the function is positive or negative. Use information to sketch graphs.
4. Understand the relationships between graphic, algebraic, and verbal descriptions of functions.
5. Given the graph of a function, be able to identify the domain, range, any asymptotes and/or symmetry,  $x$  and  $y$  intercepts, as well as find a rule for the function if it is obtained from a

standard function through transformations.

6. Define  $i$  as the square root of  $-1$  and know the complex arithmetic necessary for solving quadratic equations with complex roots.
7. Solve absolute value, linear, polynomial, rational, radical, exponential and logarithmic equations and inequalities.
8. Find the inverse of a function algebraically and graphically.
9. Perform composition of functions and operations on functions.
10. Understand sequences and be able to differentiate between geometric, arithmetic and others such as Fibonacci-type sequences, giving direct formulas where available or a numeric representation.
11. Understand series notation and know how to compute sums of finite arithmetic and finite and infinite geometric series.
12. Solve systems of equations ( $3 \times 3$  linear) and non-linear equations in two variables.
13. Make sense of algebraic expressions and explain relationship among algebraic quantities including quadratic, exponential, logarithmic, rational, radical, and polynomial expressions, equations and functions.
14. Represent and interpret “real world” situations using quadratic, exponential, logarithmic, rational, radical, and polynomial expressions, equations, and functions.

**Text:** *PRECALCULUS*, 9<sup>th</sup> Edition, 2013 Larson. The University of Utah has negotiated special pricing for the text and Webassign;

- For \$75 you may purchase the online version of the text with Enhanced Webassign. This price covers both 1050 and 1060.
- OPTION: if you would like, you may also purchase a loose-leaf version of the text for \$40.

The text may be purchased at: <http://www.cengagebrain.com/course/2765767>

**Calculators:** Calculators will be useful for homework, but will not be permitted on exams.

**Homework:** All homework is to be completed on Webassign. Due dates for homework assignments can also be found on Webassign. *Late homework will not be accepted.* You will be given ample time to do your assignments, you may ask me, the SI, or TAs questions or you may work with others on assignments. You may submit unlimited answers for each prompt. *Please note, homework is a substantial part of your grade for the course (15%), it is to your benefit to do all your homework—partial credit is better than no credit.*

**Quizzes:** There will be a total of 10 weekly quizzes (Fridays when there is no midterm.) You must be in attendance to take the quiz, however the three lowest quiz scores will be dropped.

**Attendance:** Like any college course, attendance is not “mandatory.” However, concepts will be thoroughly explained and reviewed in class, thus it is to your absolute benefit to attend all classes. Students who regularly attend score on average 30% higher on exams than those who do not.

**Important dates:**

We meet every Monday, Tuesday, Wednesday, and Friday.

*There will be no class:*

Monday, January 15 (Martin Luther King Jr. Day)

Monday, February 19 (Presidents’ Day)

Monday – Friday, March 19 – 23 (Spring Break)

**MIDTERMS:**

Friday, February 9

Friday, March 9

Friday, April 13

**FINAL:**

Friday, April 27, 1:00 – 3:00 (see: <http://registrar.utah.edu/academic-calendars/final-exams-spring.php>). The location will be announced in class.

**There are no “make-up” exams or quizzes.** Students who miss an exam or quiz will receive a “0” on the missed exam.

**Grades:** Numerical semester scores will be determined using the following formula: 15% homework, 7% quizzes, 18% *each* midterm exam, 24% final exam. The three lowest quiz scores will be dropped. Your score on the final exam will replace your lowest midterm score or you will receive a 2% bonus to your final **exam** grade, whichever results in the highest grade. You may NOT drop the final.

Semester letter grades will be converted from numerical semester scores (N) as follows:

100 ≥ N ≥ 93: A

93 > N ≥ 90: A-

90 > N ≥ 88: B+

88 > N ≥ 83: B

83 > N ≥ 80: B-

80 > N ≥ 78: C+

78 > N ≥ 73: C

73 > N ≥ 70: C-

70 > N ≥ 68: D+

68 > N ≥ 63: D

63 > N ≥ 60: D-

60 > N

## ADDITIONAL RESOURCES:

**Mathematics Tutoring Center:** Drop in, sit down, and if you have a question, someone will come by who can help you. There are also study areas free of tutors, a computer lab, group study rooms available through reservations, and group tutoring sessions that can be arranged to meet at a regular time. Located on 1st Floor of JWB or LCB. Open 8am-8pm MTWH; 8am-6pm F.

**CANVAS Page for the course:** The course has a Canvas page where all information will be kept including the link to Webassign, information about lecture videos, and reviews for exams.

**Math Department Video Lectures:** Video lectures are available at: <http://www.math.utah.edu/lectures/math1050.html>

**Supplementary Instruction:** Schedule and location will be discussed the first week of class. Postings for weekly sessions can also be found on the course Canvas page.

**TA:** The TA is available to meet with students individually.

**ADA Statement:** The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 6 Olpin Union Building, 8 - (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

## Tentative 1050 schedule SPRING 2018

Wk	SEC	Topic
1 Jan. 8	<b>Ch1 Functions and Their Graphs</b>	
	1.1	Rectangular Coordinates
	1.2	Graphs of Equations
	1.3	Linear equations
	1.4	Functions
NO SCHOOL Monday January 15		
2 Jan.15	1.5-1.7	Graphing and analyzing functions
	1.8,1.9	Working with functions (composition, operations, and inverses)
3 Jan. 22	<b>Ch2 Polynomial and Rational Functions</b>	
	2.1	Quadratic functions and models
	2.2	Polynomials
	2.3	Synthetic Division
4 Jan. 29	2.4	Complex numbers
	2.5	Zeros of polynomial functions
5 Feb. 5		<b>REVIEW</b>
	Midterm 1 (FRIDAY Feb. 8)	
6 Feb. 12	2.6	Rational functions
	2.7	Non-linear Inequalities

7 Feb.19	NO SCHOOL Monday February 19	
	Ch 3 Logarithmic and Exponential Functions and Equations	
	3.1	Exponential Functions
	3.2	Logarithmic Functions

8 Feb. 26	3.3	Properties of Logarithms
	3.4	Exponential and logarithmic equations
	3.5	Exponential Growth Models

9 Mar.5	Review	
	Midterm 2 (FRIDAY Mar. 9)	

10 Mar. 12	Ch 7 Systems of Equations and Inequalities	
	7.1	Systems of linear and non-linear equations
	7.2	Two-variable linear systems
	7.3	Multivariable linear systems

Mar. 19	SPRING BREAK	

11 Mar. 26	7.5	Systems of Inequalities
	Ch 8. Matrices	
	8.1	Introduction to matrices
	8.2	Matrix operations
	8.3	Inverse of a matrix

12 Apr. 2	Ch 9 Sequences and Series ences and Series	
	9.1	Sequences and series
	9.2	Arithmetic sequences
	9.3	Geometric sequences
13 Apr. 9	REVIEW for Midterm 3	
	Midterm 3 (Friday, April 13)	
14 Apr. 16	REVIEW for FINAL EXAM	
15 Apr. 23	REVIEW for FINAL EXAM	
*** FINAL EXAM FRIDAY, April 27, 1:00 – 3:00 ***		