

# Math 1010-090 Intermediate Algebra (4 cr)

## Spring 2018 Syllabus

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**Instructor:** Predrag Krtolica, PhD  
**Office Hours:** MF 11:45 am - 12:45 pm; online: TBD  
**Office Location:** JWB 121  
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**Website:** Canvas

### Required Materials:

- **Textbook:** Miller/O'Neill/Hyde: Intermediate Algebra, 4th Ed. (McGraw-Hill) - ALEKS 360 (electronic version found in ALEKS, or a hard-copy).
- **Access to ALEKS** (Assessment and LEarning in Knowledge Spaces). You will be instructed on how to access it in canvas, once canvas is up and running.
- **Scientific Calculator.** Important: graphing or phone calculators are not allowed!

### Dates:

Mon 1/8	First Day of Class	2/12 - 2/17 (wk 6)	Midterm Exam 1
Fri 1/12	Last Day to Add without Permission	3/26 - 3/31 (wk 11)	Midterm Exam 2
Fri 1/19	Last Day to Drop/Add		
Mon 1/15	MLK Day		
Mon 2/19	President's Day		
Fri 3/2	Last Day to Audit/Withdraw	Wed 5/2	Common Final Exam
Sun-Sun, 3/18-3/25	Spring Break	3:30-5:30 pm	
Tues 4/24	Last Day of Semester		

**Course Description:** Mathematics is a sense making activity to understand the world we live in. Scientists, social scientists, engineers, business leaders, health care providers, and politicians require a high degree of quantitative literacy to accomplish their goals. In this course, students will become adept at working with linear, exponential, basic logarithmic, quadratic, square root, and power functions, and see how these functions can be used to describe and analyze some of the most difficult problems our society faces. Along the way, functions are used to motivate important topics including evaluating expressions, solving equations and inequalities, graphing, and analyzing graphs.

**Prerequisites:** "C" or better in MATH 990 OR Accuplacer EA score of 54 or better OR ACT Math score of 18 or better OR SAT Math score of 470 or better.

**After Math 1010:** Math 1010 is designed to prepare students who are entering STEM, business, and education fields for their future math classes. Math 1010 is also a prerequisite for such courses. The following grades in Math 1010 are needed to proceed:

- C in Math 1010 for Math 1050 (College Algebra) or Math 1090 (Business Algebra)
- B- in Math 1010 for Math 4010 (Mathematics for Elementary School Teachers I)
- B in Math 1010 for Math 1080 (Precalculus which is an accelerated College Algebra-Trig course)

Note, Math 1010 is not THE prerequisite. You can also enter the above courses with certain ACT or Accuplacer scores or other class scores. Use this link for information about prerequisites: [http://catalog.utah.edu/preview\\_entity.php?catoid=14&ent\\_oid=1782&returnto=1554](http://catalog.utah.edu/preview_entity.php?catoid=14&ent_oid=1782&returnto=1554).

If you are in a major with no math requirement other than the university's QA requirement, then MATH 1030 (Introduction to Quantitative Reasoning), is likely the best math class for you. Note, the prerequisite cut-offs for Math 1010 and Math 1030 are close to each other: an ACT score of 18 gets you into Math 1010; an ACT score of 19 gets you into Math 1030. If you were able to register for Math 1010 based on your ACT score but want to be in Math 1030, consider taking the Accuplacer placement exam, and trying to test into Math 1030 using your Accuplacer score (the Accuplacer placement exam is used by and given at the University of Utah.) You can find information about it here: <http://testingcenter.utah.edu/students/placement-tests/newstudents.php>. Also, todayourbestontheAccuplacer, douse thereviewmaterial (alsoavailablefromthelink).

If you are intending to take Math 1030 (Intro to Quantitative Reasoning) or Math 1040 (Intro to Statistics and Probability), and would like to use a course as your prerequisite, it is suggested that you take Math 980 instead of Math 1010. While Math 1010 is a prerequisite for these classes, it also covers many topics that will not be used in Math 1030 or Math 1040.

If you have any questions about which math class to take, you should check with your advisor or meet with a math department advisor. The math department advisors are there for all students at the university who have questions about math classes, not just math majors. You can find information about them at <http://www.math.utah.edu/ugrad/advising.php>.

### Expected Learning Outcomes:

Upon successful completion of this course, a student should be able to:

1. Work with functions presented in tables, graphs, with algebraic expressions, or in words. Determine if relations presented in any of these formats are functions. The functions covered in this course are linear, exponential, logarithmic, quadratic, square root, power, and  $n$ th-root.
2. Find the domain,  $x$ -intercepts,  $y$ -intercepts, output given input, and input given output for all functions presented with tables, graphs, or algebra. Find the range of functions presented graphically.
3. Know the shapes of the graphs of all the above functions. Be able to recognize when a sufficient portion of the graph is sketched in order to indicate the graph shape.
4. Decide if a given function is linear, quadratic, exponential, or none of the above for functions presented algebraically, graphically, or in tables.
5. Graphing Techniques Vary by Function
  - (a) Graph linear functions using either two points or one point and a slope.
  - (b) Graph quadratic functions using both these approaches
    - i. the  $x$ -intercepts and the vertex (or line of symmetry)
    - ii. the vertex and an efficient table (be able to use symmetry and possibly the  $y$ -intercept)
  - (c) Graph logarithmic functions with no transformations using the meaning of the logarithm.
  - (d) Graph exponential and square root functions, when given in transformation form, using efficient tables.
  - (e) Graph power functions and  $n$ th-root functions with no transformations using tables.

6. Solve linear, quadratic, exponential, logarithmic and square root equations.
  - (a) Solve quadratic equations using the zero-product property, completing the square, and the quadratic formula.
7. Solve linear inequalities and give answers in inequality, interval, and graphical (number line) format.
8. Determine the slope of a line; find the equations of lines given information about them. Decide if lines are parallel, perpendicular, or neither.
9. Solve  $2 \times 2$  systems of linear equations and functions using graphical and substitution methods.
10. Be able to factor quadratic expressions or decide if they cannot be factored; complete the square.
11. Perform composition of functions presented with tables, graphs, or algebra.
12. Decide if a function presented with a table or graph is invertible and give the inverse in the same format.
13. Find the algebraic inverse of a linear function presented algebraically.
14. Make sense of exponent rules, negative exponents, and rational exponents. Use exponent rules to simplify exponential expressions.
15. Understand  $n$ th-roots, rational exponents and the connection between the two. Simplify  $n$ th roots and exponential expressions with rational exponents.
16. Construct algebraic models to describe real life situations. Be able to decide what type of model fits a situation best:
  - (a) Use linear functions to model constant rates of growth.
  - (b) Use exponential functions to model constant percent change.
  - (c) Use quadratic functions to model constant acceleration.
17. Analyze linear, exponential, and quadratic models to answer questions about the situations they represent. In particular, relate graphical features (like the  $x$ - and  $y$ -intercepts for all function or the vertex of a parabola) to specific aspects of the situation being modeled. For quadratics, be able to rewrite the function appropriately in order to find the information desired.

**Weekly Workload:** This is an online course, but still an intense course. According to the University of Utah, a 4-unit course should have about 4 hours of lecture and 8 hours of outside study/homework time. This means that our online course will take the average student about 12-15 hours per week. Some students will be able to get by on less, and some students will need more.

Each week, we cover specific sections. You can choose when you work on the material in the week, keeping your objective and topic goals in mind, but you can't complete the course at your own pace.

**Course Grade Components:** Semester grades will be calculated as follows:

Announcement Quizzes	2%	Weekly
Quizzes	7%	Biweekly
ALEKS Homework	21 %	Weekly
Midterms	40%	Two total
Final Exam	30%	<b>You have to take the final to pass the course!</b>

### Scoring Information for the Above Activities:

- **Announcement Quizzes:** Course documents and announcements are given in quiz format and have a short quiz about the content at the end. These “quizzes” begin with “A:...” Completing these is worth 2% of your grade. Suggested due dates are shown, but these can be completed at any time up to one day before the final.
- **Quizzes:** There will be six or seven take-home quizzes. You can access them on Friday (earlier by special arrangement) and they are due on Tuesdays. You will need to scan and upload them. The quizzes are worth 7% of your grade. The lowest quiz score will be dropped at the end of the term.
- **ALEKS Homework:** ALEKS is an adaptive homework system, which means it assesses what you know and what you don't know and then customizes your assignments accordingly. In ALEKS, you will work on Objectives (the equivalent of homework assignments) and periodically take Knowledge Checks (quizzes that are not graded, but determine the customization of objectives). This is how your work in ALEKS contributes to our course:
  - *16% from Completing your Objectives.* There are 14 objectives in the course, one for each week and one for each exam. Their due dates are shown in ALEKS. Partial credit is awarded. Your lowest score is dropped at the end of the term.
  - *5% from Weekly Time Goals.* This is to encourage you to work on topics every week, throughout the week. To get full credit, you need to spend 6 hours each week in ALEKS, except in the first and last week and during exam weeks. Weeks start on Sunday, 12:00 am and run through Saturday, 11:59 pm. Note, if on the day after your time-goal is due, your objective goal is higher than your time goal, then your time goal will be adjusted.
- **Midterm Exams:** There are two midterm exams. Each exam is worth 20% of your grade. You must schedule your exams ahead of time, using the Schedule exams link on the top left of the Canvas course page. Exams will be administered at the Uonline testing center (in the Marriot Library), at a satellite testing center in Sandy, or if you are out of area, with a proctor that you set up and register with Uonline. There will be practice material provided prior to each exam. You are allowed a scientific calculator on exams.
- **Final Exam:** The final exam for this class is comprehensive The date is above and the location will be announced. This is a departmental final, which means all students in all on-campus and off-campus Math 1010 classes take it at the same, instead of during the slot that is assigned based on class meeting time. You are required to take it at this time, unless you have multiple finals scheduled for the same time slot. If this applies to you, inform your instructor by the deadline given in class. (Tardy notification of your instructor may result in a penalty on your exam). For all other students, make school/work/family arrangements at the start of the semester to be able to take the common final.

**Absences:** Make-ups for documented absences that are required as part of a University of Utah obligation (e.g. athletes participating in an event, participating in a debate contest, etc.) will be granted. For all make-ups of this type, timely notification prior to the event is required.

For other absences, documentation of a reason beyond your control must be provided and make-ups will be granted only in the most extreme cases and at the sole discretion of the instructor.

**Grading Scale:** The grading scale is: A (93,100], A- [90,93), B+ [87,90), B [83,87), B- [80,83), C+ [77,80), C [72,77), C- [69,72), D+ [66,69), D [60,66), D- [50,60), E [0,50). If I do need to curve the grades, I will do so on individual assignments or exams, not on the course grade at the end of the semester.

**Additional support:** This course is designed to challenge students. You may require additional support:

- Come to my office hours. This time is scheduled for you to come and ask questions on any of the material covered in class/homework/exams or any mathematical inquiry you may have.
- The math department offers free drop-in tutoring for students enrolled in this class. The center is located underneath the walkway between LCB and JWB and can be accessed by entering either building. They are open Monday - Thursday 8 AM - 8 PM and Friday 8 AM - 6 PM.
- A list of private tutors is available from the Math Department office.

**Accommodations:** 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 & Access, 162 Olpin Union Building, 581-5020 (V/TDD). CDA 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 & Access.