Math 101: Foundations of Algebra and Mathematical Modeling

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Please use my email and not canvas messaging. Canvas messaging tends to delay sending

Office Hours: office hours will be on zoom.
Meeting ID: 944 9321 9915
Passcode: startgate

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>Monday</td>
<td>3:00-3:50</td>
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<tr>
<td>Tuesday</td>
<td>10:30-11:20</td>
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<tr>
<td>Wednesday</td>
<td>3:00-3:50</td>
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<td>Friday</td>
<td>10:30-11:20</td>
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Note: We have a learning assistant for this class. This syllabus will be updated when the LA is identified.

Text and Required Materials:

1. Foundations of Algebra and Mathematical Modeling, University of Oregon (free on Canvas)

2. Procedural Work Program:

   We will be working with authentic problem solving in class. We don’t cover the prerequisite/procedural based material as much. As such, we have programs for the procedurals.
   - If you want videos and other material to help you with learning the material, you may consider using ALEKS

     This is a purchased program. You should purchase it at the following link: [https://uoduckstore.redshelf.com/item/23636/](https://uoduckstore.redshelf.com/item/23636/)

   - If you can find your own videos on Khan Academy, feel more confident or can get more help, and need to save money, you may consider using WebWork.

     Webwork is free! I provide some Khan Academy links but it’s up to you to learn that material on your own.

   - Whatever program you choose, you must pass the procedural work with 85% as one criteria for passing the course.

3. A Scientific, NON-Graphing Calculator

4. Access to Zoom for online lectures/breakout sessions

5. Access to Canvas with a browser updated enough to take quizzes

6. We will use Geogebra and Desmos. If you are not comfortable putting your actual name in the programs, then please send me a ‘code name’ for you.
Course Description: Critical elements of pre-college algebra, topics including equation solving; rational, radical, exponential, and polynomial expression evaluation and simplification; lines, linear equations, quadratic equations, and exponential equations. Focus on mathematical modeling and preparation for additional college level mathematics.

This class will be done remotely this term. There is likely to be a lot of trial and error as we work this through. Circumstances may occur that may require changes to content or structure of the course. For this reason, consider this syllabus a tentative syllabus.

Learning Objectives: Provided at the end of this syllabus. They make a great study tool so keep them as a reference.

Classroom Policy, Procedure, and Expectations: Students are expected to take responsibility for their own learning and progress. In general, this includes being aware of university policies and deadlines as well as specific policies, due dates, and exam dates.

Course Structure:

1. Each lecture will have likely have pre-work. A lot of the pre-work is done on Desmos or Geogebra. (If you don’t want your name in those programs, choose a ‘code name’ to use throughout the term and let me know your codename.)

2. Lectures are synchronous at the scheduled time. As Covid-19 may cause problems with synchronous work, there may be times this course will be asynchronous.

3. Lectures are recorded however a lot of work is done in breakrooms and breakroom work is not generally recorded.

4. Participation is mandatory. If you can’t attend on a certain day, you will need to complete the class work on your own. You can and are expected to earn back participation credit by sending me a pdf of your makeup class work.

5. When you don’t attend, you are still required to catch up on missed material through reading and completion of worksheets on time. You are also required to make up participation points. Contact me for more details.

6. It is vital that you attend as many classes as you reasonably can. It’s more difficult to learn asynchronously without a group.

7. Take notes while in work. Have a notebook and make sure you are writing the main ideas, topics, and any errors you may make.

8. Quizzes will take place on Mondays. Monday class may end about 20-25 minutes early to allow you time to take those quizzes.

9. Post-work, procedural work, worksheets, activities, and other work are completed outside of class and usually are due on Fridays.

Workload: In general, students in a 4 credit course spend an average of 8 hours per week on assignments and study outside of class, in addition to the 4 weekly class meeting hours.
Adaptive Homework: Homework in the ALEKS adaptive online system or on Webwork will be regularly completed by students. Assignments will be due once a week (usually Friday by 11:59 pm.) The adaptive homework system will allow students to focus on the areas where they are struggling, and the software will provide assistance in these areas.

You can purchase ALeKS using this link: [https://uoduckstore.redshelf.com/item/23636/](https://uoduckstore.redshelf.com/item/23636/).

In Class Work and Participation: This is where a lot of the learning takes place. If you miss a class you are expected to make it up by completing the work on your own and turning that in.

Quizzes: Quizzes are every Monday except when there are exams.

Out of Class Assignments: Post-work, pre-work, worksheets, reading quizzes, completing in class work, and other assignments will be assigned throughout the week. I usually have this material due on Friday by 11:59 p.m.

Projects: Two multi-page written assignments will be assigned, see tentative schedule. These projects will take a significant amount of time and should be started early. Projects should show effort and organization.

Exams: There are two midterms and a final exam in this class, see tentative schedule. Most likely students will not be allowed to use books, notes, or any outside assistance on exams. Non-graphing calculators may be allowed on exams. Details will be announced for each exam. **Your cameras may be required to be on to receive any credit on the exam**

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<thead>
<tr>
<th>Assessment and Grades:</th>
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<tbody>
<tr>
<td>Adaptive Homework</td>
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<tr>
<td>Projects</td>
</tr>
<tr>
<td>Homework: Worksheets/Activities/Participation</td>
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<tr>
<td>Quizzes, Study Quizzes, Pre-Work</td>
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<tr>
<td>Midterms</td>
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<tr>
<td>Final Exam</td>
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**IMPORTANT NOTE!** In order to pass this class, students must meet three requirements:

- An overall passing grade.

- A grade of at least 85% on the procedural homework.

- A passing average for the exams, as determine by the instructor.

If you do not meet these three requirements, the highest grade you can get is a D+.

Tentative Weekly Schedule: The following is a non-binding notion of where we will be and what we will do each week. The actual assignment deadlines will be provided in class and usually also on Canvas.
Note: For space consideration, the abbreviation “AHW” means “Adaptive Homework”.

<table>
<thead>
<tr>
<th>Week</th>
<th>Class Time Agenda</th>
<th>Procedural Work</th>
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<tbody>
<tr>
<td>1</td>
<td>Linear equations of the form ( y = mx )</td>
<td>AHW #1 due</td>
</tr>
<tr>
<td>2</td>
<td>Linear equations, Applications</td>
<td>AHW #2 due</td>
</tr>
<tr>
<td>3</td>
<td>More Application</td>
<td>AHW #3 due</td>
</tr>
<tr>
<td>4</td>
<td>More Applications, Review</td>
<td>AHW #4, Exam #1</td>
</tr>
<tr>
<td>5</td>
<td>Average Cost, Systems of Linear Equations</td>
<td>AHW #5 due, Project #1 due</td>
</tr>
<tr>
<td>6</td>
<td>Exponential Equations and Regression</td>
<td>AHW #6 due;</td>
</tr>
<tr>
<td>7</td>
<td>More Exponential, Linear vs. Exponential</td>
<td>AHW #7 due, Exam #2 due</td>
</tr>
<tr>
<td>8</td>
<td>Review, Other Functions</td>
<td>AHW #8 due Project #2 due</td>
</tr>
<tr>
<td>9</td>
<td>More Other Functions, Comparing Functions</td>
<td>Finish all AHW</td>
</tr>
<tr>
<td>10</td>
<td>Catch-up, Review</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Final Exam, 5:00-7:00 Tuesday December 8</td>
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**Learning Environment:** The University of Oregon strives for inclusive learning environments. Please notify me if the instruction or design of this course results in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu.

Class Encore assistants will hold virtual office hours that all Math 101 students are welcome to attend and a learning assistant will take place in our class. Students may drop in to their LA or instructor’s office hours without an appointment to ask questions.

**Academic Conduct:** The code of student conduct and community standards is at [dos.uoregon.edu/conduct](http://dos.uoregon.edu/conduct).

In this course, it is appropriate to help each other on homework as long as the work you are submitting is your own and you understand it. It is not appropriate to help each other on exams, to look at other students exams, or to bring unauthorized material to exams.

**Learning Objectives:** A successful student should be able to succeed at an exam which focuses on the major objectives and contains a lesser focus on supporting objectives (in particular, drawing upon these for applied exercises).

Major Objectives — These objectives are priority targets on each summative exam subsequent to the introduction of that material. They include that a successful student can...

1. simplify and evaluate algebraic expressions
2. solve and simplify linear equations in one or two variables
3. interpret a point on a graph (esp. a line) in the context of a word problem
4. interpret constants in the equation of a line in the context of a word problem
5. graph linear equations in two variables
6. determine the intercepts of a given line whether from a graph, table, or equation
7. solve systems of equations
8. set up and solve a variety of real-world problems based on exponential equations, linear equations or systems of equations (using substitution)
9. manipulate exponential expressions
10. solve quadratic equations of the form \( x^2 + bx + c = 0 \) and \( a(x - h)^2 + k = 0 \) exactly
11. model formulas for functions by finding values of parameters, given data
12. determine from a table, graph, or equation whether or not a relationship between between two variables is linear or exponential
(13) write an equation defining a relationship between variables in a piecewise manner
(14) interpret the result of mathematical processes in a non-mathematical context
(15) express written descriptions between variables as the graph, table, or formula for that relationship.
(16) estimate trend lines for linear and exponential regression. Interpret the residual at a given point.
(17) successfully use technology such as Excel, Google Sheets, Desmos, and/or WolframAlpha in application to the objectives

Supporting Objectives – These objectives may be present on individual assessments, but may not be included in all summative exams. They include that a successful student can...

(1) factor quadratic and other polynomial equations using the greatest common factor
(2) identify solutions to systems of equation as either a line, a point, or no intersection (parallel lines)
(3) perform operations involving polynomial and “linear-over-linear” rational expressions
(4) solve equations containing “linear-over-linear” rational expressions.
(5) simplify and perform operations involving radicals and polynomials
(6) solve systems of non-linear equations involving quadratic and linear equations
(7) solve absolute value equations of the form $|ax + b| = c$
(8) apply the rule of functions including accurately applying function notation of the form $f(a) = b$
   for given values of $a$ and $b$ (not symbolic manipulation)
(9) Create tables and interpret points from multilinear equations such as $z = 0.2x + 3y + 4$

Prerequisite Objectives – The following learning objectives are prerequisite to the course and will be tested exclusively through adaptive homework or their inclusion as part of another objective listed above. These prerequisite objectives include the ability to...

(1) accurately use the order of operations in order to reduce an expression, including those with absolute values, signed numbers, fractions, and/or decimals.
(2) add, subtract, multiply, and divide fractions and decimals
(3) explain when and why to use common denominators when performing operations on fractions
(4) identify whether a number is a whole number, an integer, or a real number
(5) accurately and efficiently perform calculations with real numbers including fractions, decimals, signed numbers, absolute value, etc.