Text: "Modern Precalculus", 1st edition (College Algebra only), by Mike Price

Technology: If you require a graphing calculator, use it and recommend a TI-84, TI-83 Plus or TI-83. If you do not allow the use of a calculator, be prepared to a) not use one yourself (lest ye be accused of hypocrisy) and b) write exams so that the simplification of arithmetically complex problems does not overshadow the actual concept they are being tested on.

Course Goals: A student successfully completing the course should, in general, have a foundation in non-trigonometric differential calculus and be able to succeed in a non-trigonometric integral calculus course. The student can model the mathematical topics described among the learning outcomes in words, then solve or simplify the relevant equations and/or expressions, and finally write a summary statement of the solution. In short, all of the learning outcomes should be incorporated with skill at mathematical modeling.

If you're open to it, free and/or browser-based programs like Wolfram|Alpha can be of tremendous use to you and to students.

Learning Outcomes: A successful student can...

- has facility with the concept of a function and can use function notation
- has knowledge of the defining characteristics of linear, quadratic, exponential, rational, power and logarithmic functions
- can describe from a graph, formula, words, or a table if the function described is exactly linear or exponential
- has a conceptual framework for composition of functions and can compute the composition of two functions given formulas, table, or graphs of the functions
- has a conceptual framework for inverse functions and can find the inverse of a function (when it exists) given a formula, table, or graph of a function
- can model an equation relating two variables in which proportionality or inverse proportionality are described
- can find a linear, quadratic, rational, power, exponential, or logarithmic function to fit when provided (a sufficient number of) data points
- is familiar with the definition and can identify end behavior (principally $t \to \infty$) of polynomial and rational functions
- can adequately perform mathematical modeling: they can model the mathematical topics described among the aforementioned learning outcomes in words, then solve or simplify the relevant equations and/or expressions, and finally write a summary statement of the result.

A Rough Schedule of Content: This should be viewed as a tentative schedule for discussing content. With as many as 40 contact hours total for the course, and less than 30 hours of content outlined in the schedule, there should regularly be time to do homework questions, assessments (e.g. quizzes, exams), review and in-class student work.

Week	Sections to Cover	Notes	
1	Review, 1	Section 1: 2-3 hrs	Appendix Sections $10-13$ in text are review; Section 1 covers a lot of basics of functions, priority is getting them familiar with notation, solving equations/evaluating expressions with functions, and interpreting results
2	1, 2	Section 2: 2-3 hrs	In Section 2, make sure students can interpret "such-and-such decreases at a constant rate" as a linear phenomenon; percentage change is addressed in Section 2 to help prepare for "relative" growth of exponentials later on
3	2, 3	Section 3: 2-3 hrs	In Section 3, second differences are an interesting (and calculus-adjacent) way to discuss quadratics, but aren't strictly necessary
4	3, Review		**Exam 1** (approximately sections 1-3)
5	4, 5	Section 4: 1-2 hrs	Try to limit discussion of end behavior in Section 4 to comparisons of degree, true limiting behavior and notation can wait until calculus
		Section 5: 2-3 hrs	Revisit linear relationships in Section 5 to compare with the constant *relative* change in exponential relationships
6	6	Section 6: 3-4 hrs	In Section 6, try to resist doing too much "write this expression as the logarithm of a single quantity", more useful are using logarithmic properties for some additional goal (e.g. solving an equation, rewriting an expression to see that it is actually a formula for a power function)
7	6, 7	Section 7: 2-3 hrs	**Exam 2** (approximately Sections 4-7); in Section 7 don't forget composition in context; also, it is fun to do composition with "mixed media" (e.g. $f(x)$ defined by formula while $g(t)$ is defined by table)
8	7, 8	Section 8: 2-3 hrs	Finding inverses in Section 8 is another excuse to reinforce good algebra skills; try to resist the temptation to "swap the x's and y's" at the beginning of the process, like many students are familiar with: variables in context have meaning which is eradicated by this practice
9	8	-	

10	9, Catch-up and Review	Section 9: 1-3 hrs	Student course evals; Section 9 is intended to be a review section, although it isn't really labeled as such. Please take the time to at least assign exercises for practice from this set, or additionally have students work on it in class or do additional examples of this ilk. Students need practice figuring out which processes are valid when they see some random problem, and they don't get that practice unless they don't know what section the exercise is from
11	Final Exam	Finals exam week	No classes; **Final exam** at scheduled time `http://registrar.uoregon.edu/calendars/final_exam?schedule=2015-2016`

Additional Notes:

- It is extremely important that the students know that Math 111 is a pre-calculus course. It is designed for students who have a basic arithmetic and algebraic understanding that is to be built upon in order to prepare them for calculus. Not all students fit this description, but nevertheless it is the assumption.
- The content of this class may be different than you've experienced in a precalculus course (either taking one or if you've taught it elsewhere). There are fewer topics than in many other college algebra curricula, with the goal of the topics being covered in depth and with lots of varying applications. Keep in mind that probably less than 5% of the students will go on to degrees in mathematics, and that the majority enrolled are better served by a solid conceptual understanding of the topics in a social science or "hard" science context.
- Common areas of difficulty: Basic algebra (factoring, simplifying and operations on fractions), horizontal transformations, completing the square, applications of any sort, modeling mathematically in particular. Be conscious of these facts when you approach each topic so that you can be ready for the confused looks, frustrated sighs, and eye rolling. Combat them with detailed examples and ample opportunities for practice. Basic algebra review is most effective when integrated into new concepts, so do it on an as-needed basis. Students complain about the abstract problems because they aren't relatable. Students complain about word problems because they're hard. It's a difficult situation to win, but a responsible math class for predominantly non-majors involves both abstract mathematics and applications.
- Word problems should be a key feature of the course. Consider introducing new topics in a non-mathematical context (there is lots of evidence that this not only helps students learn the material to begin with, but also to retain it longer). E.g. Describing a function from the perspective of a machine like a wood-chipper or microwave oven; exponential functions from the notion of the thickness of paper after n foldings, and so on.
- There are no sections listed as optional – it is your responsibility to your students to cover the material listed. To further that end, please use this syllabus when preparing your class lecture schedule, and keep it to refer to during the term. Ask if you have questions!

- Mike has lecture guides (or in-class worksheets, if you aren't lecturing), quizzes, exams, practice packets, and word problems available upon request. These include some great lecture guides written by Leanne Merrill (note: these are written for a different book, so the section numbers don't match, but the content has a lot in common with the current text.

Other Important Dates
(`http://registrar.uoregon.edu/calendars/academic?period=Fall%202013&ts=Fall%202015`):

Monday of 2nd week Last day to drop without a W (but only 75% tuition refund)
Wednesday of 2nd week Last day to add a class
Sunday after 7th week Last day to drop — period!